

MODEL AIRPLANE NEWS

8th Year of Publication

NOVEMBER

1936

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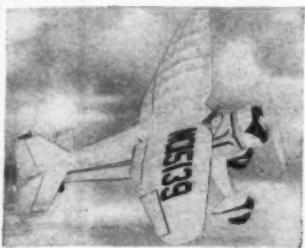
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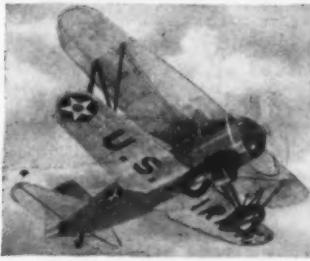


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Model AIRPLANE News

8th YEAR OF PUBLICATION

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No. 5

Edited by Charles Hampson Grant

CONTENTS

NOVEMBER, 1936

Will England Dominate the Air Lanes? By Alonzo Staples.....	6
Winnie Mae (3 view detail drawing) By William Wylam.....	8
How to Put "Revs" Into Your Gas Motor By Frank Thush.....	9
Fuselage Stability Model (Complete Plans).....	10
How to Design Your Fuselage Model By Charles Hampson Grant.....	11
Frontiers of Aviation Including: How You Can Build a Scale Model of the Vought SBU-1 By Robert C. Morrison.....	12
Air Ways Design Contest.....	15
Build and Fly the Potez 37R-2 By Nick Limber.....	16
Air Ways—Here and There.....	22
Gas Lines	26
Convert Your K.G. Into a Cabin Plane (Plans) By Robert Harrison	28
Aviation Advisory Board.....	29

In Our Next Issue

Elbert J. Weathers gives complete information for building a flying scale model of one of the most unusual German planes ever produced, in *Building the Darmstadt D-22*.

Pursuit Planes of the U.S. Army, by Gordon Sear Williams gives you fascinating details of the development of pursuit planes. Don't miss this.

In Frontiers of Aviation, Robert C. Morrison gives the interesting highlights of the National Air Races at Los Angeles. Many interesting pictures by Robert MacLaren will bring you intimate views of the contestants.

How to Build a World Record Fuselage Model, by Wm. Ying, provides you with complete data from which you can build a contest model that set a world record with a flight of 41 minutes, 19 seconds.

A World Record Hydro by Victory Fritz gives indoor fans something to try out on their work bench.

Gas Lines will tell what builders are doing with gas models in all parts of the world, also the results of the 2nd semi-annual I. G. M. A. A. Contest.

Designing Your Model for Performance, by Charles Hampson Grant, gives the principles of design which determine any particular type of performance in a model plane.

Air Ways brings you news from builders from all over the world, while **Aviation Advisory Board** gives the answers to many questions which may be puzzling you. There are also three view drawings.

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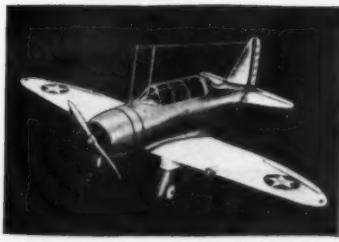
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WACO S-6—Kit No. 5A-177. Wing-span 33" **50c**



U. S. ARMY CONSOLIDATED BT-7—Kit No. 5A-178. Wingspan 31½" **50c**

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NORMANDIE (Above) — French Transatlantic Liner. Blue Ribbon Holder—Kit No. 2B-15. Length 12" **25c**

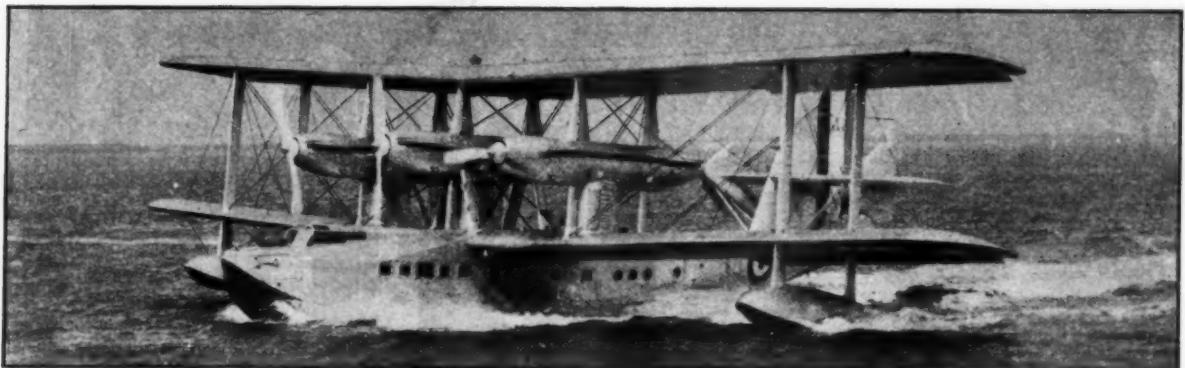


CONSTITUTION (Above) — "Old Ironsides" herself! The famous American fighting ship everybody knows and loves! Kit No. 2B-17. Length 12" **25c**

SEE CATALOG FOR OTHER MODELS

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The giant six engine Short Flying Boat that patrols the seas for England. (Globe Photo)

Will England Dominate the Air Lanes?

IN THE last few years the world has witnessed the almost complete disappearance of the biplane, in both military and commercial aviation. This fact is no more noticeable than in Great Britain where some of the finest biplanes have been produced. England has, of course, produced some remarkable monoplanes, among them the Schneider cup seaplanes, the Fairey long-range monoplane, and a few others, but most of these were special jobs and were not produced in quantity.

Military Aviation

In military aviation the world famous Hawker and Fairey biplanes were unsurpassed. The Hawker Hart, the first 180 m.p.h. day-bomber, and its developments; the Demon two-seater fighter; the Audax, Osprey, Hector and Hind were in their time probably the fastest in their class. The Hawker Fury interceptors showed exceptional speed. The Fairey Fireflies and Foxes formed the nucleus of the fast Belgian air force and the Fairey Seals and Gordons were much in use at home in Britain. Contrary to popular belief, the Hawker Super Fury was not adopted by the Royal Air Force, the Gloster Gauntlet being the fastest fighter in the service before the recent modernization program was started. Its top speed is 231 m.p.h. and it is still the equipment of several squadrons.

The recent unrest in Europe made the Britishers uneasy; in case of war their country was within easy range of bombers

How Britain Is Developing New Airplanes to Meet the Threat of Other Nations in the Race for Aerial Supremacy

By ALONZO STAPLES



A scale model of the Empire Flying Boat, designed for ocean travel. (The "Aeroplane")



The Fairey "Battle" Bomber (The "Aeroplane")

from several of the troublesome powers and their connections with the rest of the Empire could be severed at several points. The R.A.F. as their fastest fighting force, had to be completely modernized. Foolish restrictions which practically forced the manufacturers to build nothing but biplanes were swept aside. England wanted fast, agile ships as quickly as possible. Orders were placed for some of the fastest ships then available and others were placed for

planes which were still on the drawing board, the only condition being that the manufacturers guarantee their performances.

The first planes to be ordered were some of those which had appeared at the R.A.F. display at Hendon last year. One was the only biplane which has been ordered among the new planes. This single-seater fighter is a development of the Gloster Gauntlet and has been named the Gladiator. An exceptionally clean biplane, powered with an 800 hp. Bristol Mercury, it has a high speed of 260 m.p.h. and climbs to 20,000 feet in just over 9 minutes. It is armed with four machine-guns.

Another machine ordered was the Vickers Wellesley, a low-wing monoplane light bomber. It embodies the new geodetic construction which allows great strength to be built into the plane without adding weight. As a result the Wellesley is known to carry a very heavy load for this type of machine. It has a retractable undercarriage and flaps and while its performance is unknown, its clean design assures a speed of about 200 m.p.h.

An order has been placed for 174 Avro Anson coastal reconnaissance planes. This is a small twin-engined monoplane powered by two 310 hp. Siddeley Cheetahs. Carrying a crew of three, a moderate load of bombs and full sea-going equipment and considering its total power of only 640 hp., its top speed is excellent at 188 m.p.h.

The next plane to interest the Air Ministry was the Bristol Blenheim bomber.



The Bristol 142 of which the day bomber Blenheim is a development. (The "Aeroplane")



The Monospar ST-18, England's fastest airliner that will try to fly to Australia in six days. (Pictures Inc.)



The twin engined Airspeed Envoy, one of England's new ships. (Courtesy of Flight)

Another low-wing monoplane, it is probably the fastest twin-motored medium bomber yet built. Its performance is kept a close secret but it is admitted to exceed 260 m.p.h.

Just lately there has been a sudden flow of orders for some new all-metal planes built around the new supercharged, liquid-cooled Rolls-Royce Merlin motor. The horsepower of this aero engine is not allowed to be published but it is known to be the most powerful used in Britain's air force today. It is extremely compact and can be very nicely streamlined into the nose of a plane.

The first plane to appear with this motor was the new Hawker high-speed one-place fighter. It is known to exceed 300 m.p.h. and with such a speed it is thought to be the fastest of its type in the world today. It is going directly into production. The Supermarine fighter, built around the same motor is now undergoing tests. It resembles the Hawker in general design and performance. Another fighter which is being tested is the Bristol powered with a Bristol radial.

The Fairey Aviation Company just recently demonstrated its new all-metal raider named the Battle. This type of plane resembles the attack plane or light bomber in America. It also has a Merlin motor and a conservative estimate of its speed is 275 m.p.h. Incidentally, by way of showing that the aerobatic ability of the monoplane can be just as good as that of the biplane, Flight-Lieutenant Staniland, test pilot for Fairey, put this machine through every trick he could think of. It performed so remarkably that a substantial number of Battles were ordered immediately.

Everyone has read or heard of the Handley-Page heavy bombers. During and since the war this company has always produced planes of this type, which have been star performers. Their latest heavy bomber is the Heyford, a big twin-motored

biplane which carries a heavy load at 150 m.p.h. This design, however, is already a few years old and a new Handley-Page with a greatly increased performance can be expected very soon. They have already produced an efficient troop-transport able to carry 24 fully equipped men or an equivalent load of bombs. Other bomber-

and one in the tail, both protected by transparent revolving turrets, and another mid-way down the fuselage firing through a sliding hatch in the floor. It is probably one of the fastest of its type in existence.

Although biplanes are still used by the British for flying boats they are good performers. For example the Supermarine

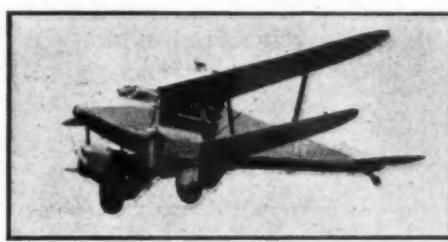
Stanraer, carrying a big load and having a long range, is known to have a top speed of between 150 and 175 m.p.h. High performance monoplanes are being designed and will be ready soon.

Therefore, considering the foregoing facts, the reader can readily realize that within a year when these planes which have been described become the equipment of the British squadrons and taking into consideration the excellent reputation the pilots of the Royal Air Force have throughout the world, Great Britain will have one of the finest flying services in the world.

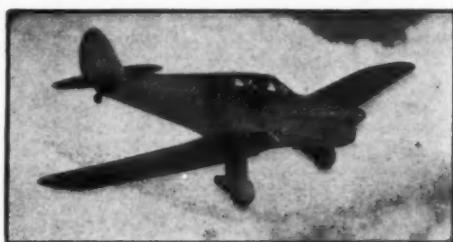
Civil Aviation

Before discussing the present commercial airplanes of Great Britain, we must consider a few factors which govern their development. As gasoline is a great deal more expensive there than on this side of the Atlantic, the use of highly-powered transport planes by the internal airlines of Great Britain would not be good business. You will notice that English ships are designed to carry their load at a fair speed on very little horsepower. Another thing which is to be considered is the short average hops, few of which exceed one hundred miles in an internal airline. Great range is therefore unnecessary. Furthermore many of the landing fields are small and the planes must require little take-off run.

Striking examples of the typical British airplane are the products of the De Havilland Co. Their series of biplane transports just about reach the maximum efficiency possible in a biplane. Probably the best



The latest D.H. development, the Dragonfly "90" with two 130 hp. engines



The Percival Vega Gull, a fast sportplane.
(The "Aeroplane")

transports recently produced are the Bristol and Armstrong-Whitworth. All are monoplanes. The latest heavy bomber to be adopted by the R.A.F. is the Armstrong-Whitworth Whitley driven by two 800 hp. Siddeley Tigers with variable-pitch De Havilland-Hamilton propellers. It is an excellent looking mid-wing ship built entirely of metal. It has positions for two pilots and three gunners, one in the nose



The new Armstrong-Whitely Bomber and Hawker Furies.
(Globe Photo)

The Hawker Fighter.
(The "Aeroplane")





known of these in this country is the DH86 or Express Liner. Well streamlined for a biplane, it cruises at 145 m.p.h. with 12 passengers and luggage on four Gipsy Six engines totalling 800 hp. A later version with variable-pitch props carries the same load at a cruising speed of 155 m.p.h. The Dragon Rapide, a development of the earlier Dragon, powered by two 200 hp. Gipsy Sixes, cruises with six passengers at 133 m.p.h. This company's very latest

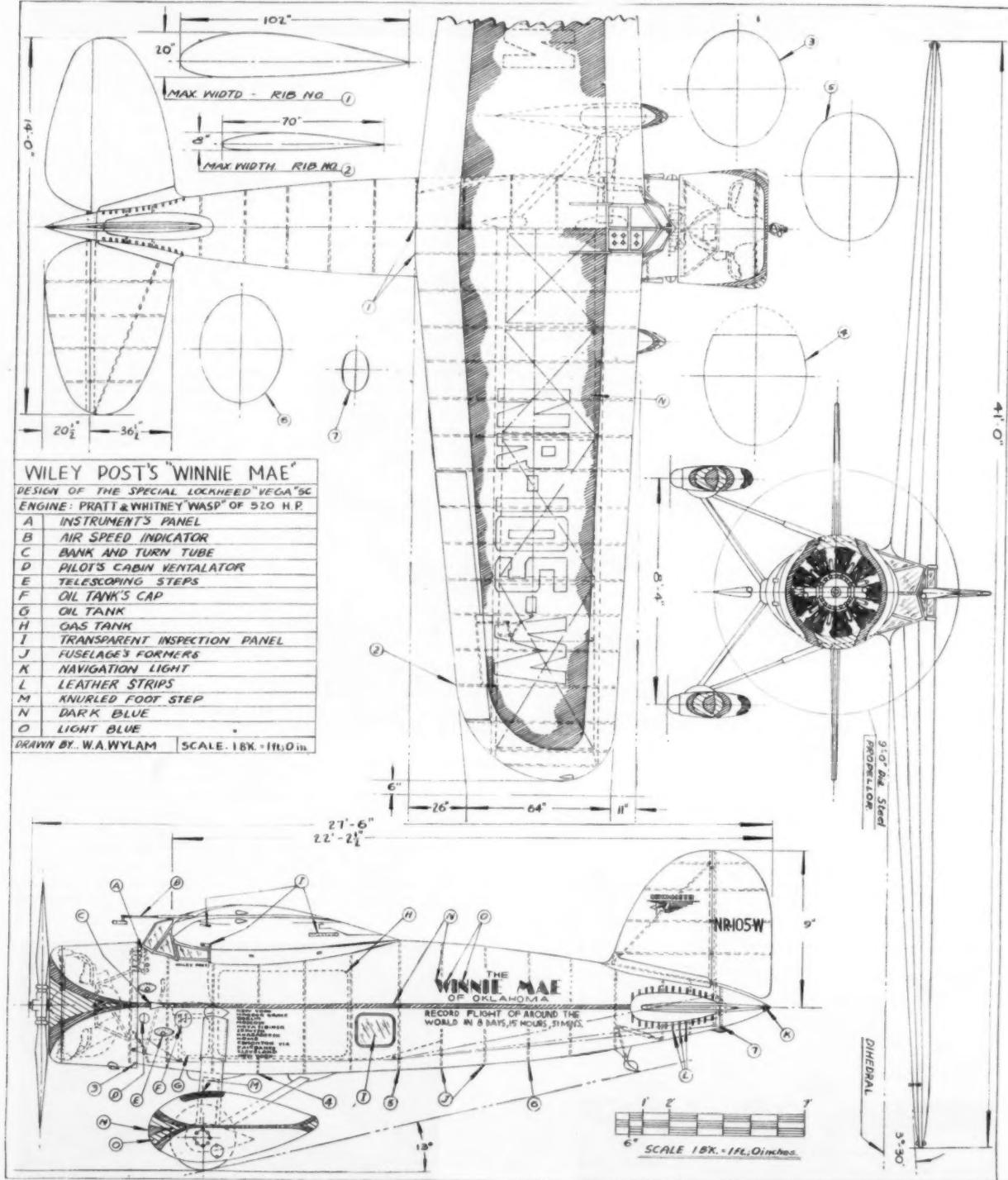
light transport or twin-engined sport plane is the Dragon-fly. Powered by two Gipsy Majors of 130 hp. each, this graceful streamlined little biplane cruises with five at 130 m.p.h. with a range of 885 miles.

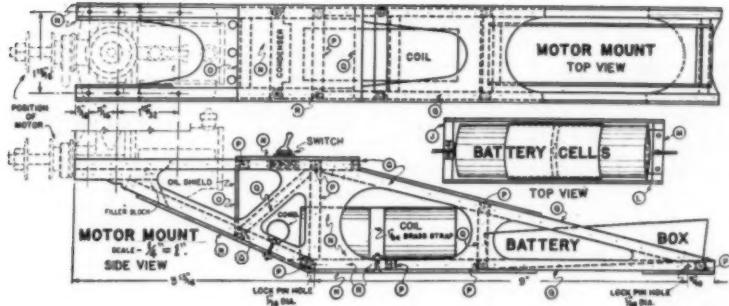
These transports and others like them are still very popular in Britain and a large number were sold, but those sold to foreign companies had to compete with faster but more powerful ships. To satisfy foreign customers as well as those at home, the

industry had to produce planes as fast as foreign makes, as economical as the planes they had already produced, and having a high degree of comfort.

A start was made with small monoplanes. Two of these were successful enough to be ordered in quantity in a modified version for military purposes, by the Air Ministry. The Avro Ava from which the military Anson was developed

(Continued on page 37)





How to Put "Revs" Into Your Gas Motor

By FRANK TLUSH

DO YOU model builders give your engine the care it deserves? Probably some do, but on the whole the others take theirs for granted. They expect their engines to perform faultlessly at all times, not thinking of course about all the attention that has to be given them. Work it like a Mack and expect it to perform like a watch, forgetting that the little put-put is really a delicate piece of precision work. You never really can be too fussy. One of the most important reasons given for the care that these engines require is the high speed at which they operate, and the thin walls of both the piston and cylinder. You know of course the damages that are liable to result if some sand gets into the cylinder, but many fellows never give it a second thought at the contest field. They just pour the gasoline into the tank and then hope for the best. Then when their motor refuses to function properly because of a clogged gas line, they spend all day trying to remedy the fault. All that precious time wasted trying to fix something

High Powered Ammunition

From an Expert That Will Enable You to "Shoot" Your Gas Motor Troubles

which should have never happened. Do you remember the time when your engine refused to function at the most critical time of the day when the thermals were just right and you wasted a complete day working on your engine? When you finally succeeded, the contest was probably over or the ideal time for breaking the world's record was gone. You swear and doubly swear to be prepared for the next contest, but it's usually the same old story over and over again.

Wiring, mounting, batteries, spark plugs, etc. How many contests have been literally thrown into the waste basket? You fellows can answer that question yourselves.

Now that that's off our chest, let's get down to business and do something about it. Let's make competition stiffer for each other so that there will be more scientific research going on than just guesswork.

There are approximately six points that we must know and always keep in mind if we want to become experts at the game.

The first thing that we want to know about of course is how the two-course engine operates.

A cycle in engineering is any operation or sequence of operations that leave the conditions the same at the end as they were in the beginning.

The two-cycle engine requires only two strokes, or one revolution to complete the cycle. This engine is sometimes called a valveless engine because of the absence

It takes a smooth running engine to give your plane altitude so it can glide like this one.

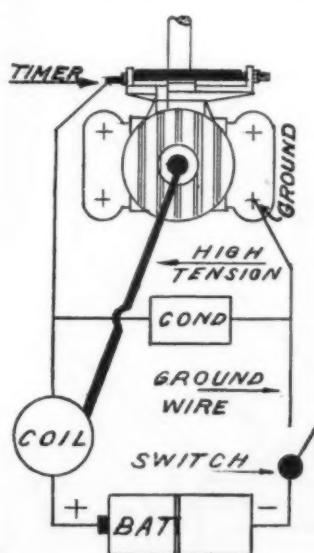
of valves. As the piston receives an impulse, every other stroke a flywheel or propeller is employed to drive the piston through the non-impulse stroke. Starting with the piston at the top of its stroke, the combustible charge of gasoline is compressed and ready for ignition. On the down stroke, the charge in the combustible chamber is ignited by the spark plug, and the resulting pressure forces the piston downward.

At the beginning of the stroke the crankcase is full of a combustible mixture that has been drawn in through the ports and which is compressed by the piston on its down stroke. When near the bottom of the stroke, the top edge of the piston uncovers a series of ports in the cylinder wall through which the burned gases escape; the pressure in the cylinder dropping to about atmosphere. Shortly after the exhaust ports have been opened or uncovered, the piston, still moving downward, uncovers the transfer ports in the cylinder wall. These are situated diametrically opposite the exhaust ports. The transfer of the mixture from the crankcase to the cylinder is made through the ports in the piston. These register with the ports in the cylinder wall and admit the mixture into the bypass from whence it passes into the cylinder through the ports.

The top and bottom ports close simultaneously. To prevent the incoming charge from passing directly across the cylinder and out the exhaust ports, transfer and exhaust ports being open at the same time, the top of the piston is provided with a baffle or deflector plate which deflects the gas up to the top of the cylinder, thus aiding in cleaning out the exhaust gases.

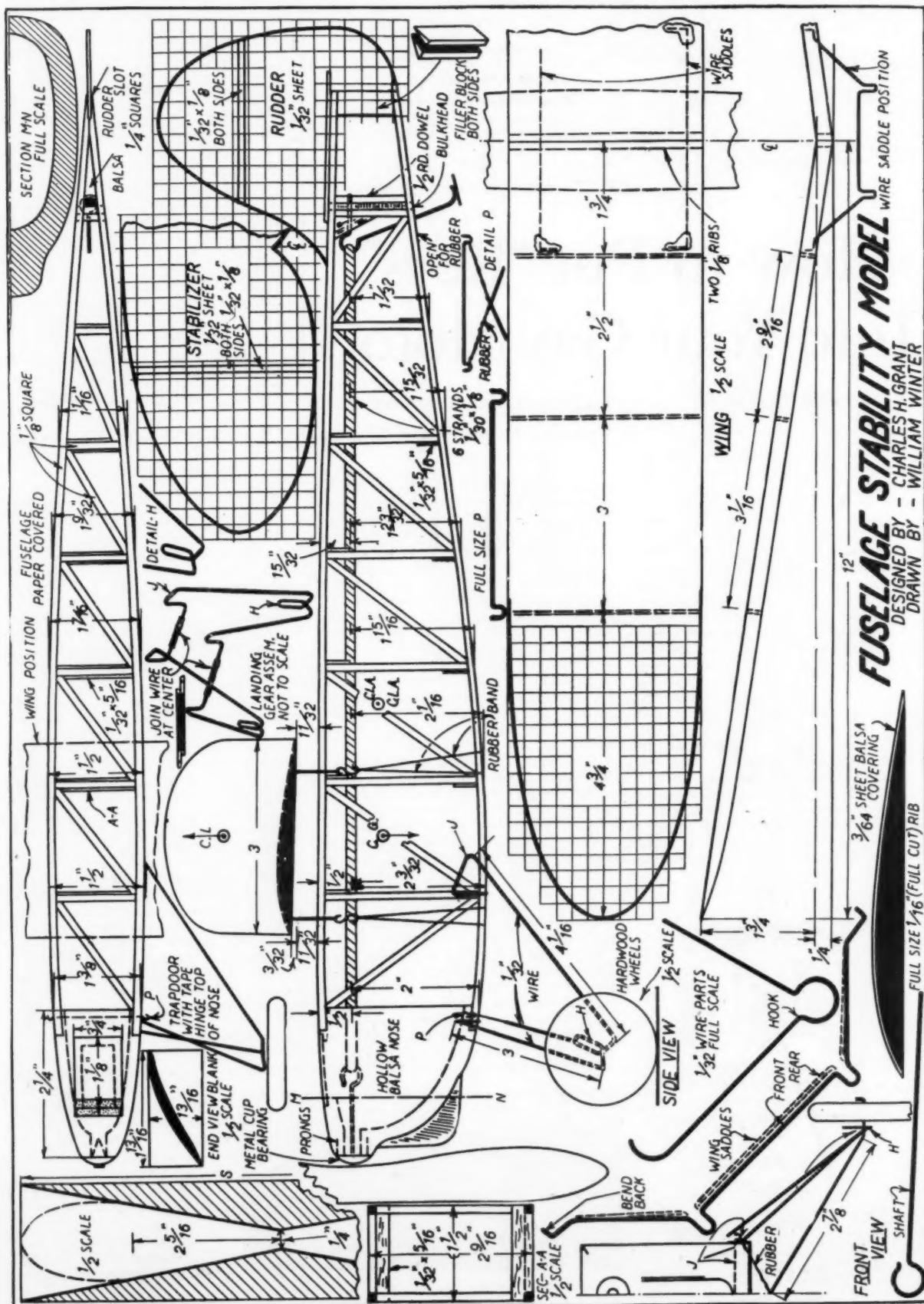
The ignition which is one of the most important factors

(Continued on page 32)



A balky motor on the take-off caused this. Look out, it may happen to your ship.





How to Design Your Fuselage Model

Chapter No. 5

THERE are many model builders who seek simple fundamental rules or hints of design that will assure them of completing a successful model plane without the necessity of delving deeply into the underlying principles and reasons which govern the procedure. Therefore, in addition to the detailed explanation of the procedure of fuselage model design, given in the preceding issues of MODEL AIRPLANE NEWS, a general summary of the governing characteristics of a fuselage "stability" model is given. This will enable them to build models, the design of which will be basically correct. Understanding of details and a higher degree of accuracy in laying out the proportions of a model will come naturally with added experience.

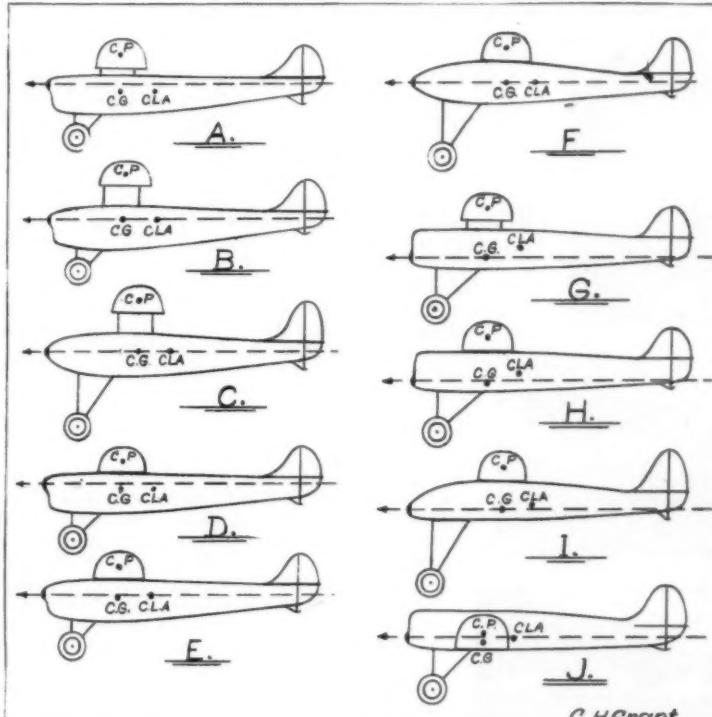
The general proportions and design characteristics of a stability fuselage model follow. In the summary the general rule for the value of each design factor is given as well as the absolute value selected for the stability fuselage model which appears on page 10.

SUMMARY OF DESIGN FACTORS

1. Wing span, 24 inches.
2. Wing chord (1/6 to 1/10 of span), 3 inches.
3. Camber (1/10 to 1/12 of chord), 3 inches.
4. Propeller diameter (1/3 to 1/2 of span), 8 inches.
5. Propeller pitch (1 1/4 to 1 1/2 times diameter), 11.2 inches.
6. Propeller blade area (10% to 20% of wing area), 9.01 sq. inches.
7. Size of propeller block required (when a regular rectangular block is to be used with diagonal guide lines extending from opposite corners), 13/16 x 1 13/16 x 8 inches.
8. Dihedral angle of wings (elevation of each wing tip above center of wing, 1/2" to 2" per foot of span), 1 1/4 inches elevation on each tip.
9. Fin and stabilizer moment arm (40% to 60% of span), 11 inches.
10. Distance of propeller bearing from center of wing (1/4 to 1/2 of fin moment arm), 5 inches.
11. Fin area (9% to 12% of wing area), 6.30 sq. in. (wing area equals 70 sq. in.).

How to Choose the Correct Design for Your Fuselage Model by Consideration of the Characteristics of Various Model Types.

By CHARLES HAMPSON GRANT



C.H.Grant

12. Stabilizer area (30% of wing area), 21 sq. in.

13. Position of the C. of G. (distance below line of thrust of 1/24 stabilizer moment arm), 1/2 inch.

14. Distance of Center of Pressure above C. of G. (20% to 25% of stabilizer moment arm), 2 1/2 inches.

15. Vertical disposition of the Center of Lateral Area. (Distance above center of gravity should not be more than 20% of distance from C. of G. to Center of Lift), 1/4 inch above C. of G.

16. Horizontal disposition of the Center of Lateral Area (approximately 15% of the total fuselage length to the rear of the C. of G.), 2 1/4 inches.

If model designers will make a layout of their models on their drawing boards to conform with the specifications given in the summary and then build their planes to conform with the relative position of the factors given, they will have a model of unusual stability. The weights of the structure of the model should be disposed so that the C. of G. will be in the previously selected position.

A Simple Method of Designing

The most stable force arrangement for a model plane having been described and the underlying reasons for it discussed in

Article No. 56

preceding pages of this series of articles, it is quite natural that the model designer will wish to know what the effect of other force arrangements will be.

Fig. A in the diagram on this page represents the side view of a plane embodying the most stable force arrangement. The other figures represent models that may be built around a variety of other possible force arrangements. A careful analysis of these various model types will disclose their relative merit for any specific purpose the designer may have in mind. The side view outlines shown will also serve as the basis of a very simple but effective method of design.

Of course builders cannot expect the product of such methods to be as efficient as those produced through careful calculations carried out in conjunction with a complete understanding of the fine points of design. However, the simple methods will serve the embryo designer well until he can

improve his art through experience. The simple method of design mentioned above, however, may be followed with the assurance of success in most cases. The procedure consists of giving careful consideration to the side view outlines as shown in diagram in respect to their flight characteristics, and then to choose the outline type that will have the desired qualities in respect to stability and performance. Usually models with the same side view outline will have similar flight characteristics in respect to their stability and general performance. The diagram shows side view outlines of various types of models. Let us examine these closely in the light of the flight characteristics each one may possess.

Every model should embody lateral, directional and longitudinal stability to some degree. The purpose of a model is to fulfill determines the degree of stability it will have, for usually models do not possess efficiency and yet a high degree of stability. As a rule stability must be sacrificed to some extent in order to obtain unusual duration, distance or speed. Thus, some of the outlines given may not insure great stability but may be suitable for models, the prime purpose of which is duration, distance or speed.

(Continued on page 42)

Frontiers of Aviation

By ROBERT C. MORRISON

Astounding New Developments That Are Taking Place
in Army, Navy and Transport Planes—How You Can Build
a Scale Model of the Vought SBU-1



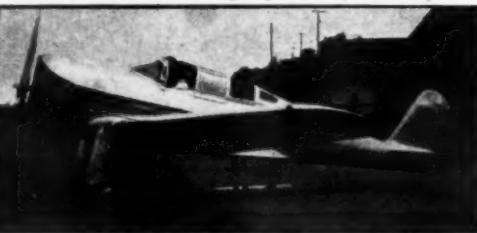
The new Lockheed "12" of which several have been ordered by the U.S. Army



Here's the latest autogyro with only two rotor blades, being tested in England. (Globe)



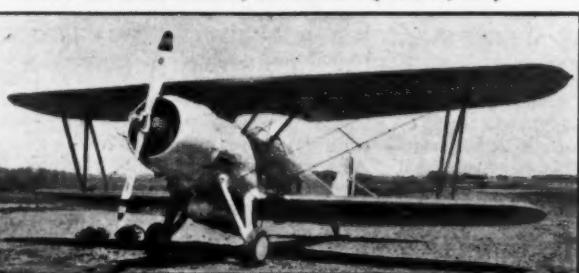
The Fairchild 24C-8E sportplane. (Williams)



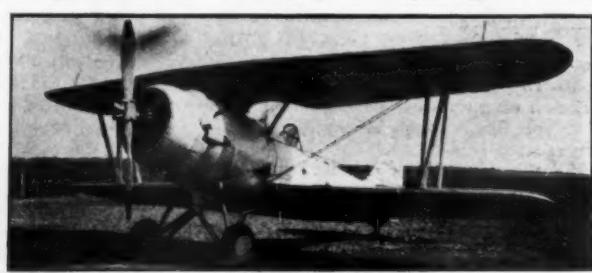
The Curtiss-Wright 19-R. (450 hp.) (By Hosley)



Here's the latest Dornier, the Do-18. (Pictures, Inc.)



The Great Lakes BG-1 powered with a 750 hp. "Wasp." Note the "dive bomb" beneath the body. (Wm. Yeager)



The Vought XSBU-1 with a 700 hp. "Wasp." Note its similarity to the Great Lake Ship. (Yeager)

TWELVE engines develop a lot of horsepower for one airplane, but that is what we may see in the near future. The rumor has been spreading about San Diego, Calif., with the earmarks of being authoritative that the Consolidated Aircraft Corporation may begin construction of a huge twelve-engined flying boat, when their new enormous experimental building is completed. Design of the ship is said to be well under way.

Their present brand new factory will be almost doubled in size when the proposed extensions are built. One of these extensions will be a large experimental building where all new Consolidated planes will be designed and built. Added floor space will total 200,000 sq. ft. at a cost of \$800,000, including machinery. So we may expect to see many new planes from Consolidated.

Besides the 110 twin-engined flying boats now being built for our Navy, Consolidated has received an \$870,000 order for the same type of ship from Argentina. Modifications will be made in the planes for export, and it is said that they will be slightly smaller than the popular P3Y-1 boats.

A recent version of the P3Y-1 has an enclosed gun turret in

the bow. Changes have been made in the tail surfaces and other minor modifications have been made in the plane.

Consolidated's pursuit plane that was at Dayton in competition with Seversky (the latter receiving the order) was a PB-2A ship converted into a single-place long range pursuit. The pilot sat in an enclosure directly behind a 735 hp. Curtiss Conqueror engine. A headrest faired in back of the enclosure into the tail of the fuselage, gives the plane a very good-looking appearance.

At this writing many new planes have just been completed and others are very near the stage of completion. Foremost among these is Douglas' new twin-engined commercial flying boat, details of which were successfully kept in seclusion until just recently. The plane is a development of their Navy job with two engines located in the leading edge of the wing. It will be slightly smaller than the huge clipper ships now used by Pan American Airways. Test flights will be given the plane soon. We hope to bring you further information of this new modern Douglas flying boat at an early date. It will be used by Pan American Airways.

Lockheed's first Model 12 has been completed and has undergone tests by the Army Air Corps at Dayton. As we go to press, about twelve of these planes are now on order, and it is expected that several will be ordered by the Army soon. For Army work, slight revampings will be made in the 12s. A top speed of 230 m.p.h. has been claimed for the Model 12 with two Pratt & Whitney Wasp Jr. 450 hp. engines.

The proposed 14 passenger Lockheed



The Russian monster duration plane that flew 6600 miles non-stop. It has a spread of about 112 feet and a single M-34 motor. (Sovfoto)

is scheduled for completion about the month of March of next year. Lockheed engineers expect it to be the fastest transport in the world. It is said that Lockheed is developing something for stratosphere work, but as yet there has been no definite statement from the company.

Revampings recently took place on Laura Ingalls' Lockheed Orion at the factory.

The 1936 National Air Races probably featured more new racing planes than ever before. Next month we will bring you full details and photos of the swift racing jobs as well as a brief narration of the events that took place. Details of the new racing planes should prove to be of unusually great interest.

Again that very active Curtiss Aeroplane & Motor Company has received another large order for planes. This time it is from the Army. Planes ordered: Y1A-18 twin-engined attack ships. Price: \$1,259,235, total. This plane has been described in former issues of this paper. We might add here that it is of all-metal construction, is a mid-wing plane, and both landing gear and tail wheel are completely retractable. It is powered by two Wright Cyclones housed in large nacelles in the leading edge of the monospar wing. The pilot sits high up on top of the fuselage in a long narrow enclosure with excellent visibility. The nose of the fuselage much resembles the nose on the De-Havilland comet racers. A large single rudder is at the tail.

A limited number of these planes were ordered to undergo service tests before they are ordered in large quantities because this is the first time a twin-engined attack plane has been accepted by our Army Air Corps. Thus the "Y" designation. If these planes prove successful, for undoubtedly they will, the Army may order many hundreds of this type of ship. Many safety devices are incorporated in the planes.

Northrop may enter this field with a twin-engined plane soon.

The Taylorcraft Aviation Company which has completed the first of their new two-place high-wing monoplanes and have successfully tested it are now settled in their new factory at Alliance, Ohio, and will begin construction of their small sportplane on a large scale immediately.

Curtiss-Wright "Tech's" Bunting, a mid-wing, single-place, open cockpit job was recently completed by the students and was test flown by that famous pilot Tex Rankin. The ship is powered by an Aeronca engine and is very fast. It was built for experimental purposes and will now be dismantled. It is said that sheet metal instead of fabric will be used for fabrication when the small plane is rebuilt.

Static tests on the new Shelton Crusader have been completed and assembly of the first plane has started.

Spartan's new low-wing, all-metal, four-place sportplane appears to be very fast. It is powered by a 285 hp. Jacobs and will soon be followed by a Pratt & Whitney (450 hp.) powered Spartan. The new chief engineer of Spartan is Mr. Herbert Rawdon, designer of the Travel-Air Mystery Ship, once chief engineer of the Curtiss-Wright Airplane Company, and former instructor of the Curtiss-Wright Technical Institute of Aeronautics. Mr. Rawdon has had

(Continued on page 38)



This stretcher with wounded man fastens beneath the wings of a Russian ambulance plane



The Lambert twin engine Monocoach. (2 Lamberts of 90 hp.)



The new Seversky BT-8 trainer of 400 hp. (Williams)



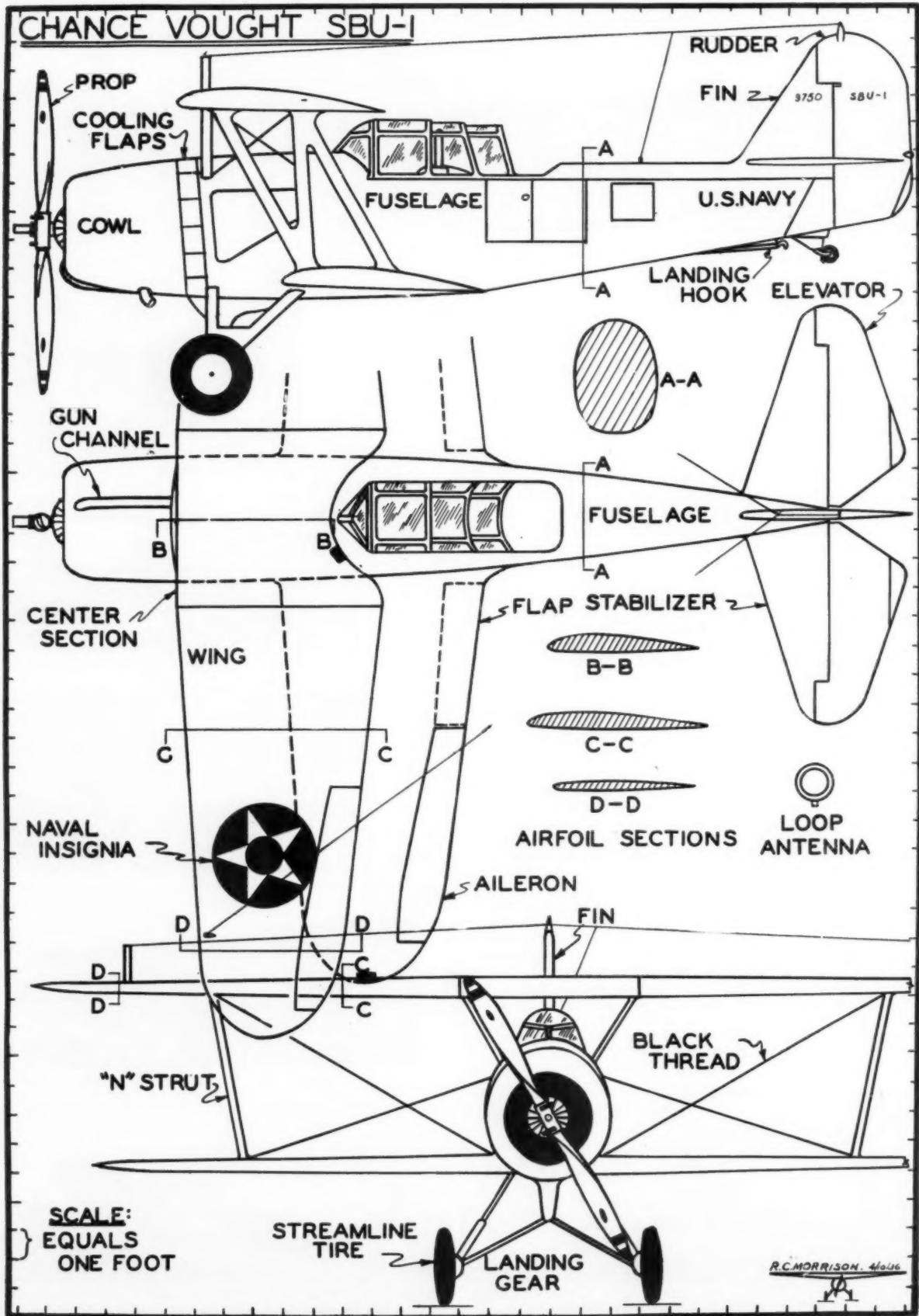
This is the Russian Red Cross plane that carries stretchers. (Sovfoto)



The Consolidated PB-2A with supercharged Conqueror engine, the U.S. Army's latest two-seater pursuit



The Consolidated Special long range pursuit bomber with a 735 hp. Conqueror. (Wm. Yeager, both pictures)



Air Ways Design Contest

Complete Results of the First Design Contest and Vital Features of Design That Determined the Final Results—Contest No. 2
and How You Can Enter It

MANY anxious Air Ways Club members have been waiting patiently to hear the final results of the Air Ways Design Contest. Designs for many excellent planes were submitted. The fact that so many were good made it more of a task for the judges to separate the good points from the faulty ones and compare them accurately. Before we tell you of the winners and discuss the points of the designs submitted, we wish to draw attention to the points on which the models were judged.

They were printed in our August issue and are as follows:

1. Plans were to be submitted in ink.
2. The design characteristics of the model.
3. The character of the construction of the model.
4. The manner in which the plans are laid out on the page in respect to their clarity of meaning; that is, the ease with which the person building the plane may understand the plans.
5. The neatness of the drawing.

Judging the entries in the light of these points the winners of the awards were as follows:

Harold Hemmis of 422 Madison Street, Stevens Point, Wisconsin, won the first prize award of \$20. Second place, \$12, was won by James A. Hamilton of Campbell, California, Box 266, Route 1. Third place went to Donald Hansen of 523 Kouns Street, Topeka, Kansas, who won \$7. Malcolm J. Abzug of 240 West 75th Street, New York City, was fourth. He won \$3. Fifth to tenth places were awarded \$2 each. The winners were:

Elbert J. Weathers of 2720 Poinsettia Drive, San Diego, California; J. R. Young-

man of 2206 West Douglas, Wichita, Kansas; Warren Amster of 601 Grove Street, Montclair, New Jersey; Domenick Serano of 16 Van Cleef Street, Jersey City, New Jersey; Stuart Collins of 9939-211 Place, Queens Village, New York; Clay Johnson, Jr., of Granbury, Texas.

Probably our readers will be interested in knowing why some designs won and some did not. The whole purpose for which this model was to be designed was stability, with an eye for duration. In order to stabilize any model to the greatest extent the following points should be incorporated in it:

The center of gravity should be a suitable distance below the center of lift. It should have a correct angular setting of the wings and stabilizer. The line of thrust should be at or above the center of gravity. The stabilizer should be a large percentage of the wing area. These points will insure longitudinal stability. The wing should have suitable dihedral. This insures lateral stability. The fin should have sufficient area which area is determined by the size of the propeller, the amount of the dihedral and the area of the wheels and their distance forward from the center of gravity.

The characteristics of the model which would insure duration are light weight, low forward resistance, efficient propeller design in comparison with the machine to be used with it and the correct angular setting of the wings and stabilizer.

Now let us look at the design of Harold Hemmis' model, drawing for which appears at the bottom of the page. The center of

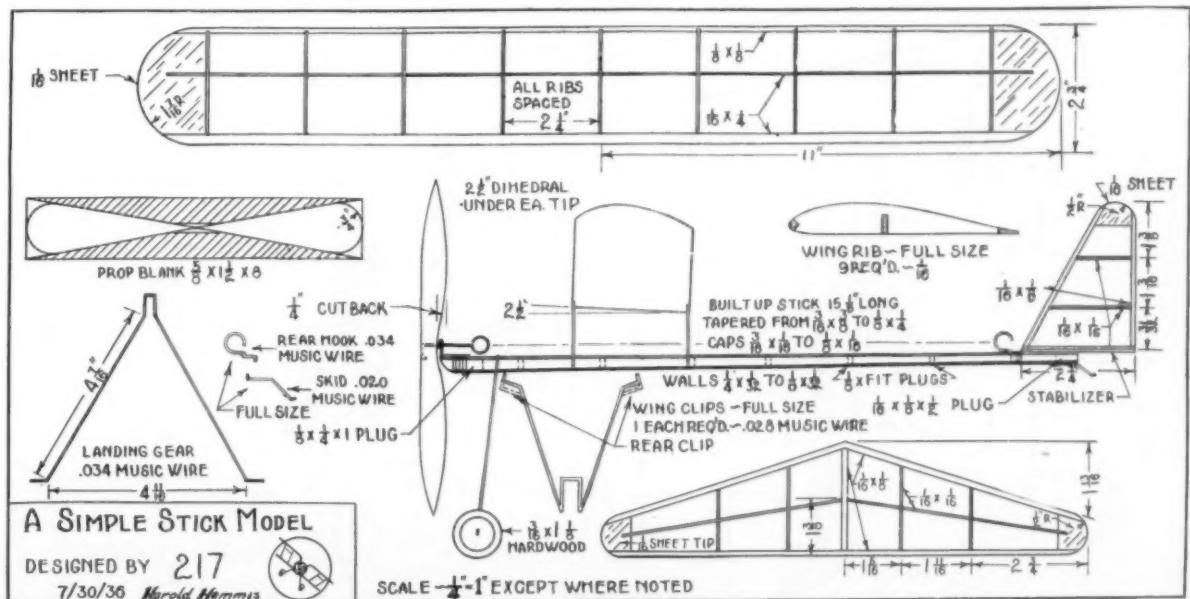
gravity of this model would be approximately at the line of thrust, possibly at the bottom of the motor stick inasmuch as the wheels are of hard wood and heavy. The wing is located well above the stick, which provides a large distance between the center of lift and the center of gravity. This makes for longitudinal stability.

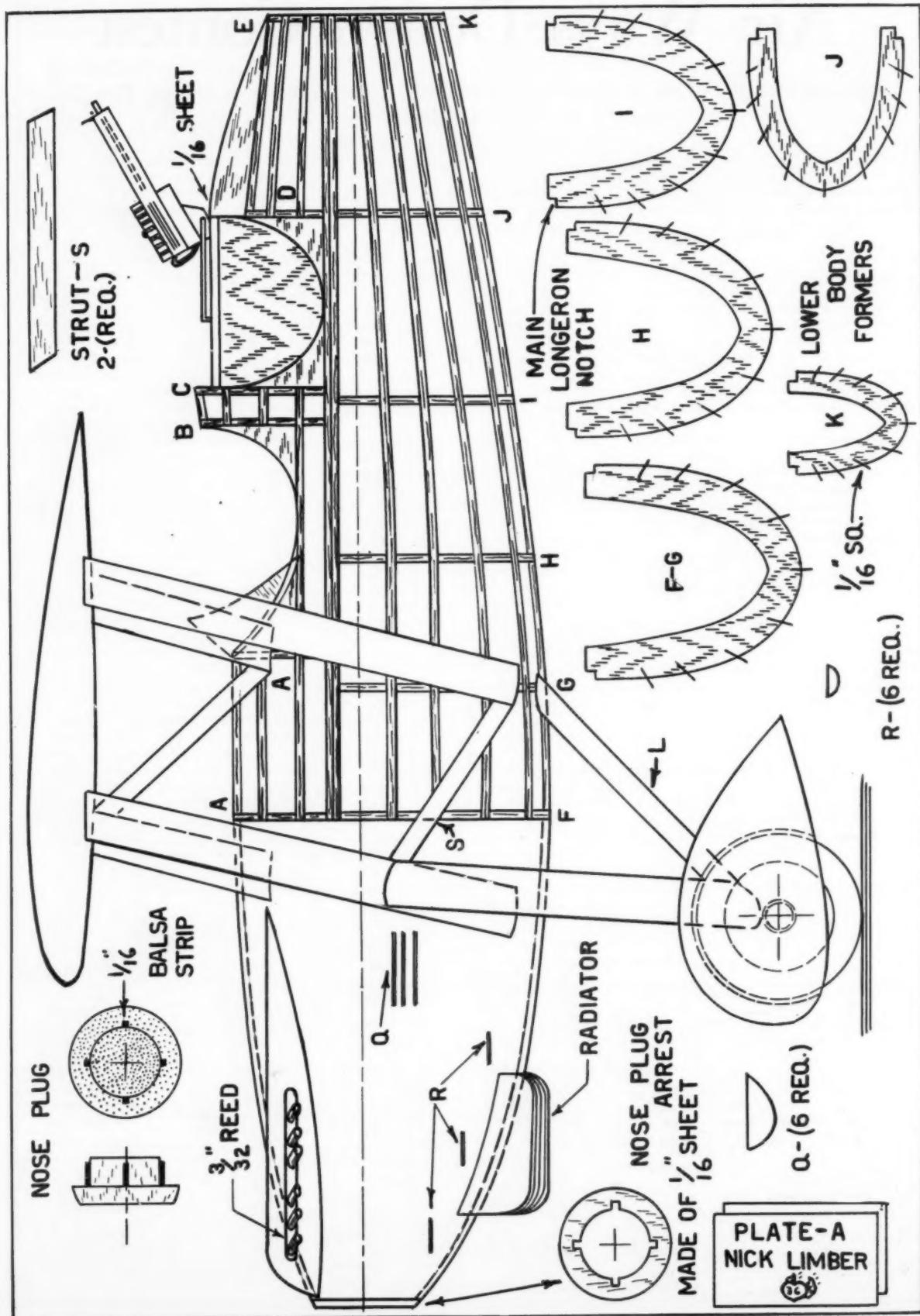
The wing is of very light construction and therefore, though it is parasol, will not raise the center of gravity extremely. The center of gravity is at or below the line of thrust. The landing gear is fairly heavy which insures that the wing will be in a position which is well forward. The area of the stabilizer is about thirty per cent of the wing area. This is ample and promotes longitudinal stability, considering the fact that the wing is located well forward.

Now let us consider the angular setting of the wing. The main plane is set at two and a half degrees. This will insure efficient duration. The stabilizer is set at zero. This is where Mr. Hemmis made his only mistake. The plane would fly with the stabilizer set at zero, but more efficient operation and greater stability would have been attained if it had been set at one-half to three-quarters of a degree positive angle of incidence, considering the fact that he has parasoled his wing.

When a parasol wing is used the line of resistance is raised considerably, causing an extreme nosing up moment which compresses the tail. This moment must be neutralized in such cases by setting the stabilizer slightly positive. If the wing had not been parasoled but was located at the motor stick, a zero degree stabilizer

(Continued on page 44)







The completed model, accurate to scale and an exceptionally fine flier when fitted with the flying propeller

Build and Fly the Potez 37R-2

MANY model builders who prefer building the latest airplanes often sit up and take notice of an older plane which they have overlooked. This month we are presenting just such an airplane. The Potez 37R-2 is not an old plane but it has been overlooked by the model builders. Plans for this ship were kept strictly confidential by the French Air Ministry until a short time ago. When the ship was first introduced by Potez, people outside of official circles believed the ship to have a speed of 133 m.p.h. Today we know that it can fly at 164 m.p.h. when fully loaded. It is of all-metal construction, including the covering. It has a total weight of 5,558.73 lbs. and has a 24,606 ft. ceiling. If we stop for a moment to consider, we can easily understand why a ship of this type has been popular in the French Air Force. It is the type of ship that the model builders have been waiting for. The type of ship that flies even better than it looks and you must admit it is a trim-looking bus at that. Before you attempt to construct your model might I suggest you make sure you understand the drawings completely. This will help you work more smoothly once you have started.

Fuselage Construction

Cut all the fuselage forms from 1/16" sheet balsa. Drawings of the forms appear on plates A and B. By referring to plate A you will notice that the main part of the fuselage is constructed in two pieces. Forms for the lower part must first be made and glued to 1/16" sq. longerons. Once the two main longerons or stringers have been glued, the auxiliary stringers are glued in the notches of the forms. The same procedure is followed in the construction of the upper part with the exception that the two cockpits are made of 1/32" sheet balsa and glued between the proper forms. The gunners' pit may prove a bit difficult but if you wet your sheet before you try to shape it in cylindrical form, it will prove to be very simple indeed. We now may glue the two parts of our fuselage. The two main longerons are used as the parts of the fuselage that hold the two shells of the body together.

When the main part of the fuselage has been completed we turn our attention to the nose of the ship. The nose is carved of two soft balsa blocks that are glued together after they have been given the desired shape

How You Can Create a Realistic Scale Model of a Famous French Pursuit Plane That Will Have Excellent Flying Qualities

By NICK LIMBER

and thickness. The blocks we use must each be $3\frac{3}{8}'' \times 2\frac{3}{8}'' \times 13/16''$. The side view is traced from plate A and the top view from plate B. You may construct each part or half of the nose separately or you may glue the two blocks lightly together and then shape them. The correct shape of the nose may be obtained from the body forms A and F and the nose plug arrest shown in plate A. You use sandpaper to form the nose. Once the proper outer shape has been obtained, you take the blocks apart (if you have glued them lightly together as suggested). By using a sharp knife with a narrow blade you will be able to carve out the inner portion of the block. Finish the inner surface with sandpaper and be sure that the walls are no thicker than $\frac{1}{8}$ ". With this operation completed you then reglue the two pieces together and the nose block is finished and ready to be cemented to the already completed portion of the body.

Now turn your attention to the tail boom. The boom is constructed of two balsa blocks that have been shaped, hollowed out and then glued together. The drawings of the tail boom are on plates C and D. Plate C shows the side view and the cross section of the portion of the boom that we glue to body forms E and K. The balsa blocks that are used for the tail boom construction are $4\frac{1}{8}'' \times \frac{5}{8}'' \times \frac{3}{4}''$. After you have shaped the blocks as required, you proceed hollowing out the inner portion. Hollow this until the walls are slightly over $1/16''$ in thickness. A pencil with thin sandpaper wrapped around it will prove very useful in sanding down the inner surface of the walls. Before we glue the two pieces together, we must glue two pieces of hard strip balsa in the tail boom so as the tail plug will not spin when we start to wind the ship. The ends of the strips must come flush with the end of the tail boom. When you have finished gluing these strips you glue the two halves of the boom together and cement it to the fuselage. Please note that the strips you glue as tail plug arrests are $1/16''$ in thickness and that they are glued straight and not at an angle.

Our next step is to make the motor hoods for the nose of the ship. Drawings of these will be found on plate E. Two hoods are required and if the model builder

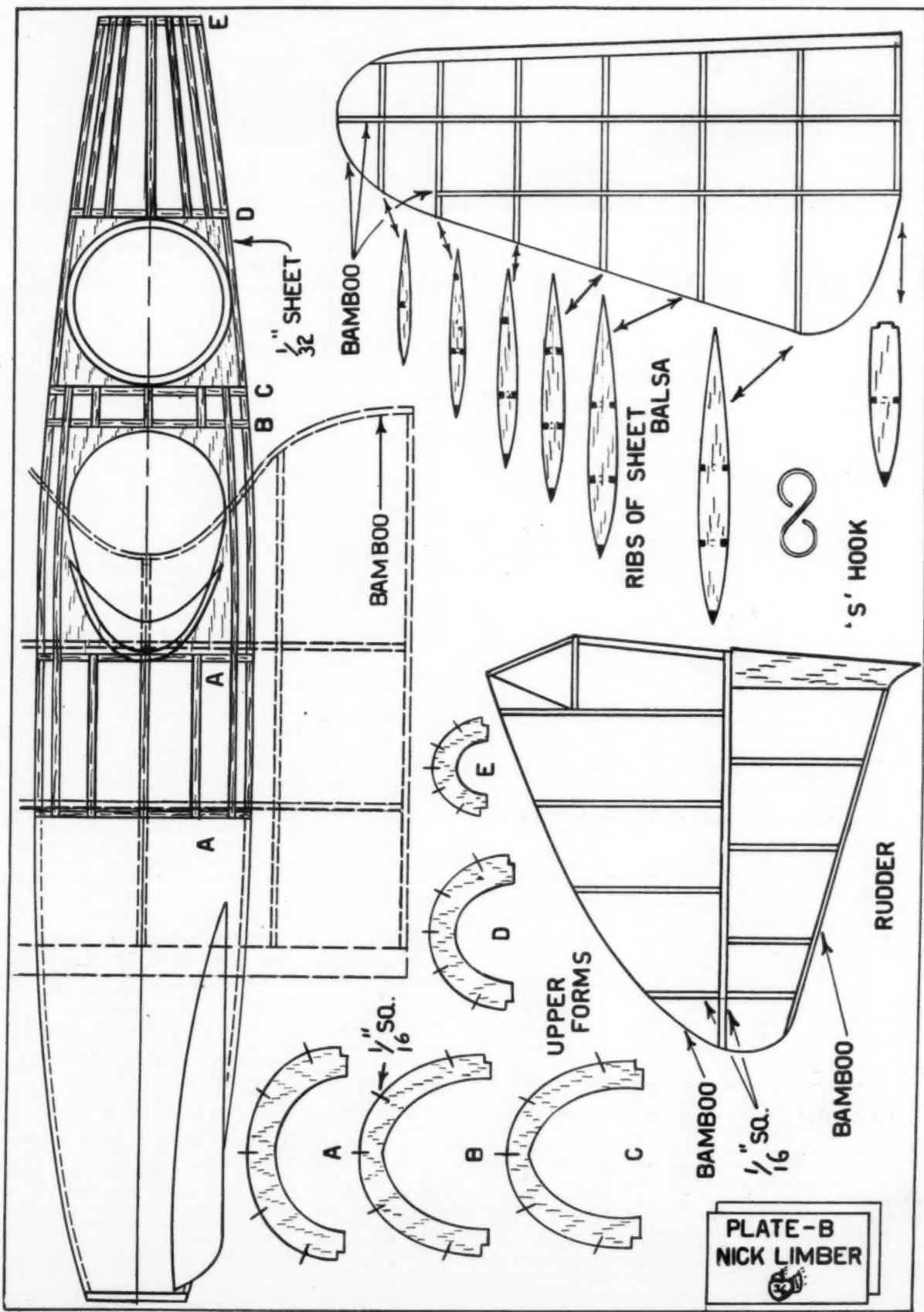
wishes to reduce the weight he may hollow them out. If you are not a person who has been building models for a long time, I would not advise hollowing the motor hoods. When you have completed them by referring to the front view of the ship, which is also on plate E, you will see just at what angle to glue them on the nose. If you place a bit of excess cement around the hoods you will be surprised at the swell fillet it makes. Our attention is now focused on plate A and the nose plug arrest. This arrest is carved from $1/16''$ sheet balsa and glued to the forward part of the nose. We are now ready to cover our fuselage. If you wish you may use sanded $1/32''$ sheet balsa covering as the model in the photographs. If however, you are not accustomed to covering ships with balsa, use tissue. Be sure however, that you avoid wrinkles as they ruin the beauty of the ship. Regardless of your choice for covering material, dope the fuselage. More dope is applied if you have chosen tissue. If you have used balsa, sand the surface between each coat of dope. I would suggest three coats if a fine finish is desired.

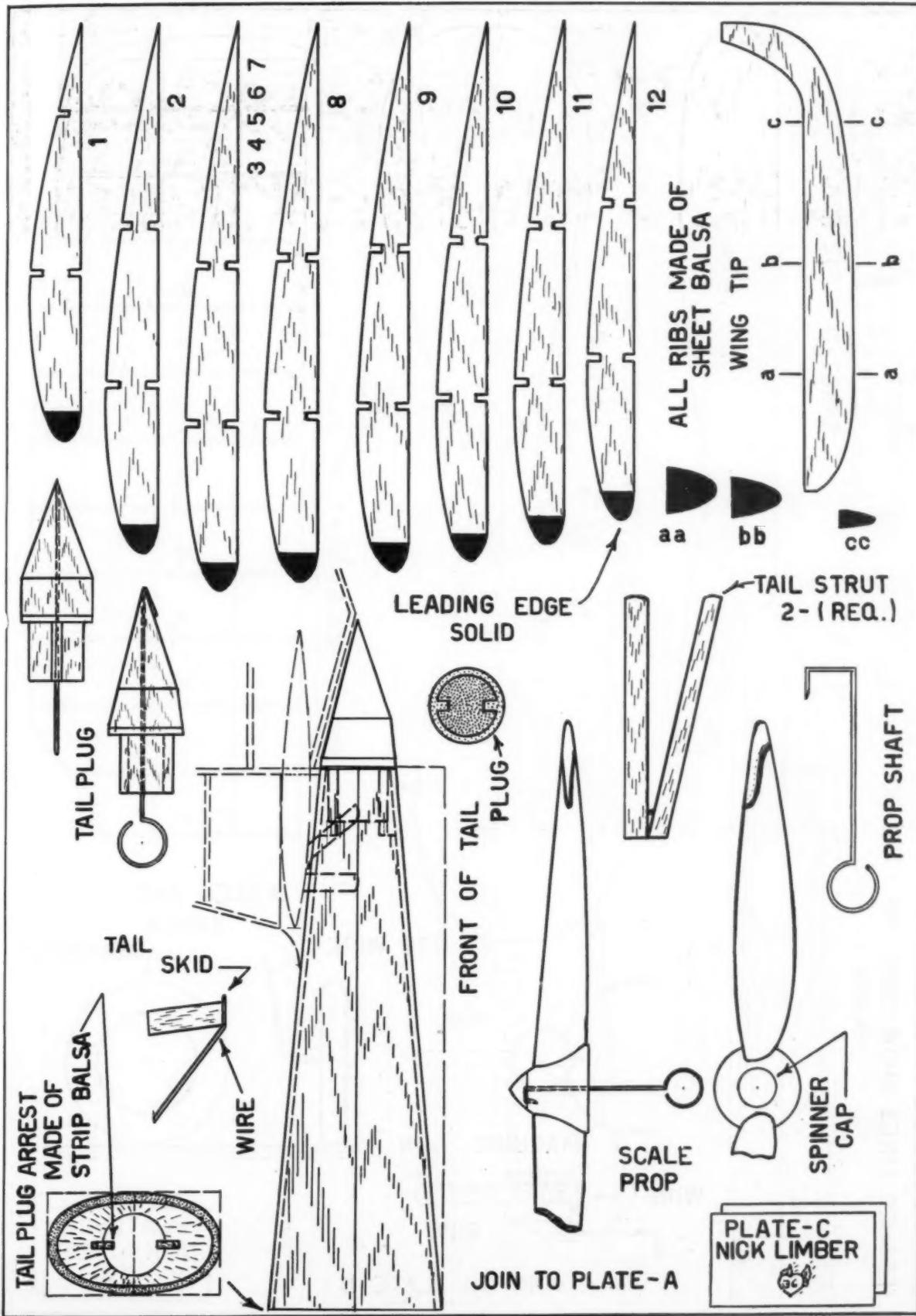
Now that our fuselage is finished, or almost finished I would suggest constructing the tail surfaces.

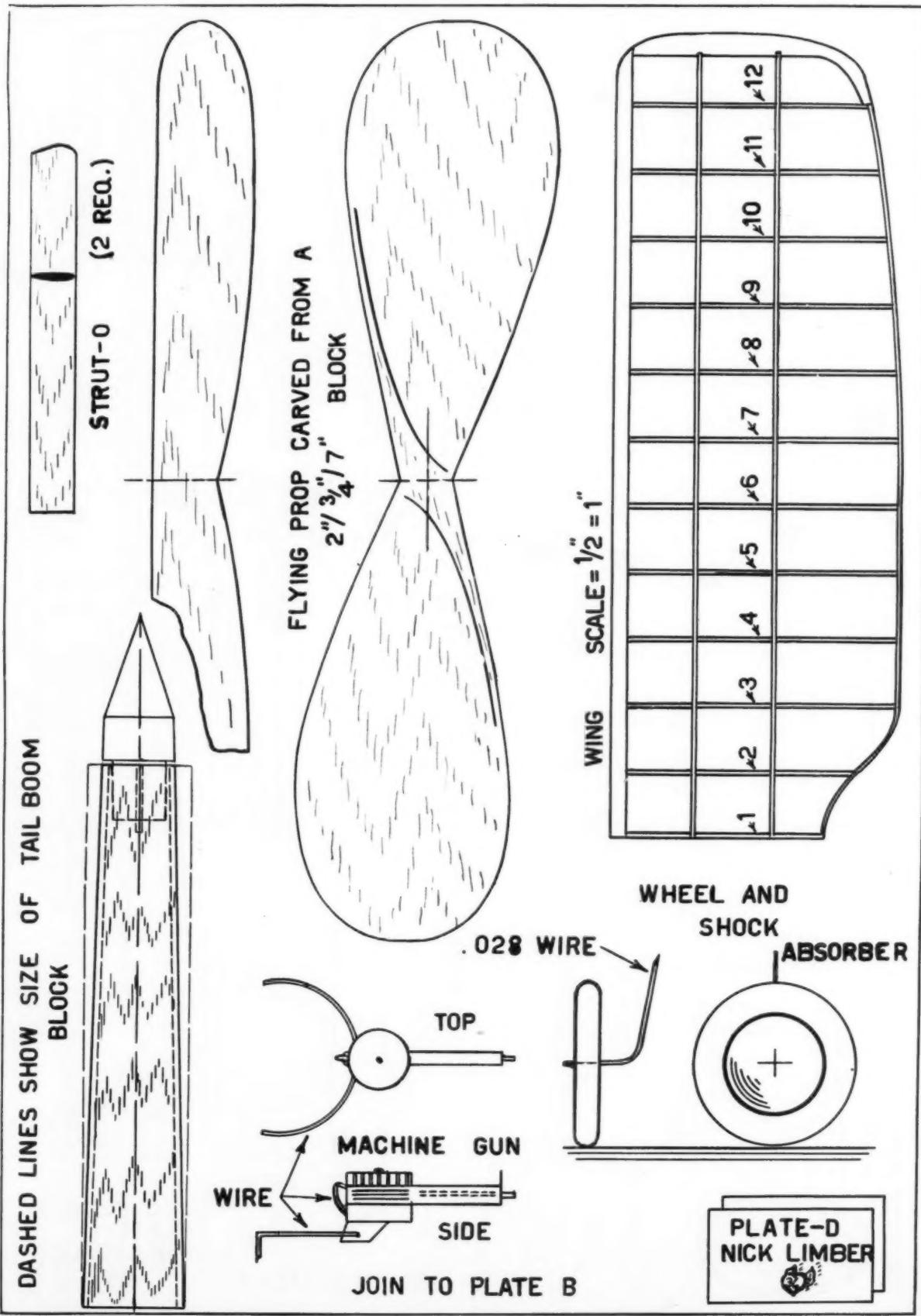
Tail Assembly and Mounting

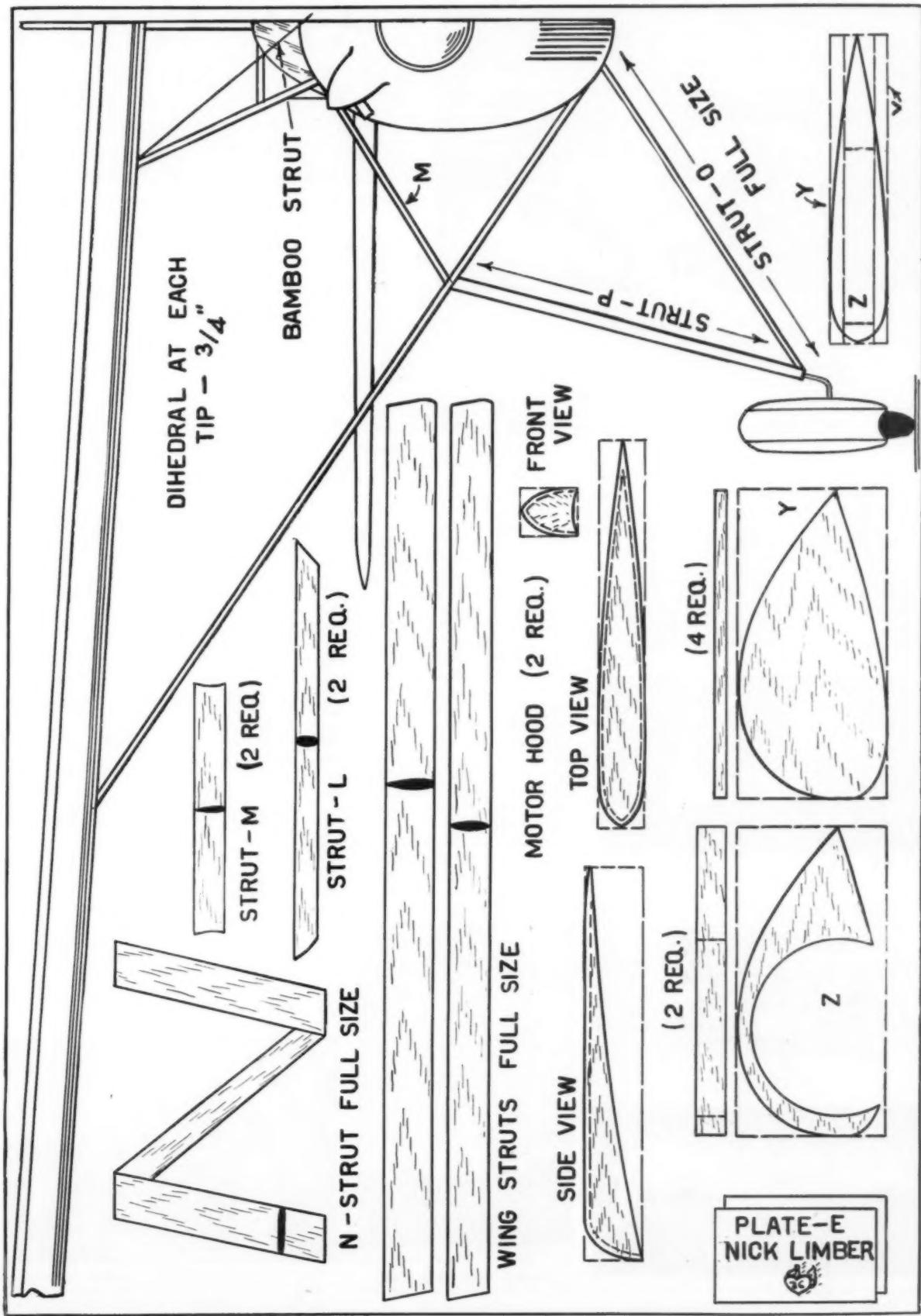
For drawings of the tail we turn to plate B. Let us first construct the elevators and then the rudder. The elevators are constructed in two pieces and are then glued to the base of the rudder. The leading edge of the elevators is $\frac{1}{8}'' \times \frac{1}{8}''$ sanded. The ribs are of $1/16''$ sheet balsa and the spars of thin bamboo. The tip and trailing edge is also of bamboo. In constructing the elevators first cut out and glue the ribs to the spars the proper distance apart as shown in the drawing. Then we shape the leading edge and glue that to the ribs. Our final step is to steam the bamboo trailing edge and glue that into place. A candle flame will prove useful in shaping the edge. After you have completed both sides, allow to dry and proceed with the rudder. The base of the rudder is of $1/16''$ sheet balsa and the bracings of $1/16''$ sq. strip. The

(Continued on page 35)

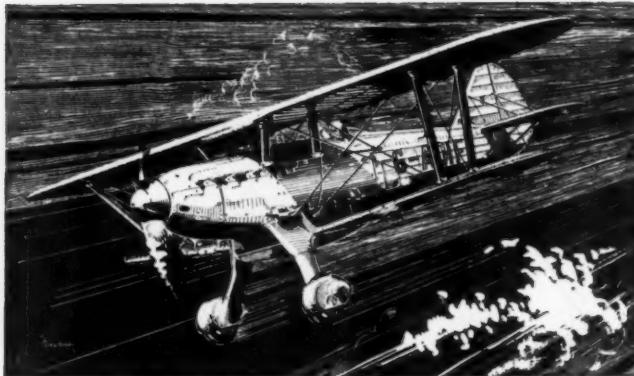








AIR WAYS HERE AND THERE



What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Send Pictures and Details of Your Experiments

Air Ways Club News

The Fairey "Fantome" Cannon plane, by Alec Ingram

THE first Air Ways Design Contest has come to a close and many excellent entries have been received. Probably many members of the club are interested in seeing the plans of the winning ship. This and descriptions of other ships entered in the contest, and some interesting notes concerning the winners and the design of their planes, may be found on page 29. Also full information on the second Air Ways Design Contest is given.

Now to tell you something about the pictures and news that has been sent to us this month. We are greatly honored in having a beautiful drawing of the Fairey "Fantome" Cannon Plane by Alec J. Ingram of England, to dress up our Air Ways pages. Mr. Ingram is a prominent English aviation enthusiast as well as an artist. A full description of this plane

will be found in "Frontiers of Aviation."

Picture No. 1 indicates how the manufacturers of model airplane kits have improved in their design in the last few years, for the picture shows the skeleton framework of a plane made from a kit by Don N. Ranney of 203 14th Avenue S.E., Rochester, Minn. It is a beautifully designed job as well as being faultlessly constructed. It appears that Don took a few liberties with the design, for he says:

"The model has an extremely streamlined airfoil (that is, negative camber on the bottom surface) so I inverted it top side down which resulted in the most stable model I have ever seen. Of course a sharp angle of incidence was used to compensate for the inverted airfoil. The model is a consistent flier, and goes about two minutes, powered flight, adjusted for low altitude flying. The weight with ten strands of $\frac{1}{8}$ " rubber and air wheels is exactly two ounces."

Mr. Ranney informs us that he has been building models for seventeen years and is just beginning to really like the sport. We suppose in the next seventeen years he will be devoting all his time to it. Some fans take a long while to get going but when they do—

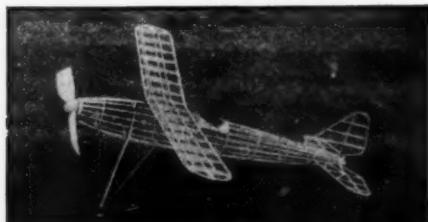
It appears that after many hours of arduous labor and high pressure selling we have been able to get over the idea of the value and pleasure that may be derived from model airplane

building to the older folks. Lately we have had many letters from parents of boys in which they show a great interest in this sport. To them it is entirely new and they hardly realize that this thing has been going on for years. We have a letter from such a gentleman, Mr. W. F. Peters of Sidney, Montana, Box 602, who says that he and his son have been reading our magazine for some time and building models.

He sends us picture No. 2 which shows his Ryan monoplane in full flight. This is one of the most unusual flight pictures that we have received. Evidently Mr. Peters has spent considerable time studying photography as well as model airplane building. It is notable that this is not a faked photograph but one of actual flight.

Few model builders undertake to build compressed air or compressed gas models. However Jack Mitchell of 611 East Indian Street, Midland, Michigan, has braved the difficulties of such an undertaking and has managed to finish a very excellent looking Taylor Cub carbon dioxide gas model, which is shown in picture No. 3. Originally the plans were made for a rubber-powered model; however, he says that he redesigned the structure to make it stronger so that it would take a compressed gas unit.

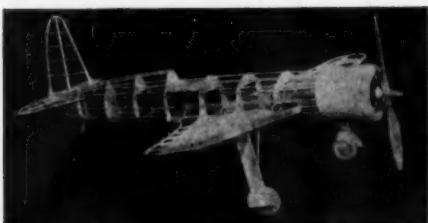
There are always a few fans who like to trick our Air Ways readers and make them think that their models are real ships. Mr. Hugh Scott of Oilcenter, California, Box 246, is a builder who sends us his contribution to this class this month. He sends picture No. 4 which shows his Boeing F4B-4 reposing, supposedly, at an aviation field. It certainly looks realistic. The model is built beautifully, even to the hub details of the changeable pitch propeller.



Pict. No. 1. A neat structural job by Don Ranney. It flies for about 2 minutes



Pict. No. 4. A well detailed realistic view of Hugh Scott's Boeing F4B-4



Pict. No. 5. Billy McCracken's model Howard Hughes Racer. The landing gear retracts



Pict. No. 2. There's no fake about this flight. A fine shot of W. F. Peters Jr.'s Ryan low wing in action



Pict. No. 7. Wake up America, here comes Australia. The New South Wales division of the M.F.C. of Australia at the July Championships



Pict. No. 9. The Hastings and Napier model clubs of New Zealand. Mr. G. P. Smith is director

One of the most startling airplanes that has ever been produced is the Howard Hughes Racer. There is more in the design of this plane than many fans realize. Billy McCracken of 719 Beaumont Avenue, Greenville, Illinois, has evidently been taken with this ship, for he sends us picture No. 5 which shows the uncovered framework of his latest model of the Howard Hughes Racer. It has a span of 20½" and an overall length of 22½". These proportions are correct, strange as it may seem. The model has a retractable landing gear, tail skid, controllable prop and a built-up motor made of balsa, tubing, pins, etc.

MODEL NEWS FROM OTHER COUNTRIES

Australia

We have news from Mr. F. E. Williams of East Street, Ipswich, Queensland, Australia, who is one of the leaders of a progressive club of model builders in this town. He sends us picture No. 6, showing a group of the young fliers. Left to right, standing in the picture: Mr. Selwood, holding Williams' plane; Mr. Jones, Mr. K. Johnson, Mr. Kugatoff, and Mr. J. Horne. The other model builders are unknown.

Picture No. 7 indicates the intensity of model airplane activity in Australia. We are indebted to Mr. Ivor Freshman of 67 Liverpool Street, Sydney, for the picture, which shows a group of the contestants at a contest held last July. They are the New South Wales division of the Model Flying Club of Australia.

This contest was one of the National Monthly Championships, results of which follow:

In the Wakefield Trophy:

J. D. Allcroft, averaging 1 min. 22 sec., first; R. Gorrell, averaging 1 min. 11 sec., second; E. E. Luke, averaging 1 min. 5½ sec., third.

The winner receiving the Australian Broadcasting Commission's Medal.

In the Anthony Hordern Trophy (R. O. G. minimum span 24 inches):

A. Dive, 7 min. 43 sec., first; R. Gorrell, 2 min. 19 sec., second; R. Grimly (Queensland), 2 min. 12 sec., third.

The winner receiving the Air Centre Medal.

In the Angus & Coote Cup (open to all types and all sizes of models):

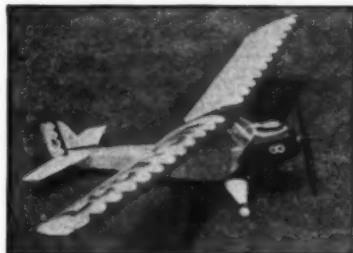
P. R. Campbell, 8 min. 29 sec., first; S. Sharp, 3 min. 12 sec., second; C. Lucas, 2 min. 16 sec., third.

Mr. Freshman writes:

"It is hoped earnestly that a means of financing a team from the United



Pict. No. 10. Some members of the five-year-old Newcastle Model Aero Club examine a model Hawker. They were winners in a recent contest



Pict. No. 3. Jack Mitchell made a fine job of this carbon dioxide gas powered Taylor Cub



Pict. No. 6. A group of expert Australian model fans, directed by Mr. F. E. Williams



Pict. No. 12. Donald Kinsey and his model Taylor Cub. The parent plane noses in the background

States to compete in Australia sometime next year will be found, as far as fares are concerned."

Mr. Freshman infers that all expenses while in Australia will be taken care of by the Model Flying Club.

South Africa

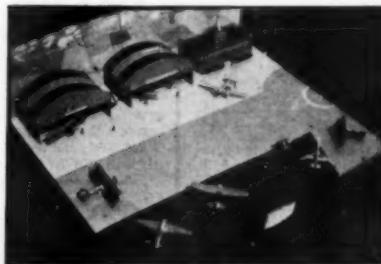
One thinks of South Africa as a very remote place and one that is not associated with the more advanced sciences. However, such is not the case, as picture No. 8 will indicate. This picture shows an exhibit which was promoted by Mr. R. W. Hill of Cape Town, P.O. Box 1906. It was held recently in Cape Town. This is one of the finest pictures of an exhibit that we have been able to print. Unquestionably readers will find interesting points about many of the models if they will examine them closely. Mr. Hill is a model airplane dealer and has done a great deal toward stimulating model airplane activity in South Africa.

We hear also from Mr. P. M. Barrett, Chairman of the Models and Junior Aeronautical Club of Johannesburg, P.O. Box 3248. He also tells us that South Africa has fairly recently become interested in model building and though it is not flourishing as yet, it is establishing itself rapidly. This is promoted by the very favorable climatic conditions of that country.

The Junior Aeronautical Club was established about a year ago by Mr. A. K. Garwie, who is president. The club now has a membership of over forty and has overcome the difficulty of securing necessary materials locally.

At present the club is busy building models for the Empire Exposition, to be held in Johannesburg from September to January. One of the features that the club is preparing is a complete history of the development of aviation. Models of typical machines from the very first Wright plane to the present day will be featured. Mr. Barrett says that data such as the articles appearing in the 1934 issues of MODEL

(Continued on page 40)



Pict. No. 11. This model airport won first prize at the annual Vancouver Air Show



Pict. No. 8. An exhibit of some beautiful models at Cape Town, South Africa

THE CATALOG

**Everyone has been
that no modelbuilder can afford to be without it.**

★ ★ ★ *Saves Modelbuilders, Inventors, Home Craftsmen, Time, Trouble and Expense on Purchases*

To build this great catalog, with its tremendous assortment of kits, supplies and small, extremely hard to get materials, we have had to contact nearly 100 firms—meaning that if you wanted to get all the material this catalog lists, you would have to send to that many concerns, as you can just see what a tremendous saving we have enabled you to make by having all these fine model parts and all the items on cover in one catalog that is good to print. 64 pages have already been planned to be crammed as full as we dare in six-point type, that beautiful modern face, known as Memphis, easy and pleasant to read. Brief descriptions only will be given so that the

greatest variety of items may be listed. By the time we prepare this number of pages, we may have a good many more items still ready and the number of pages might be increased.

This Cleveland "Catalog" is as comprehensive with its tremendous assortment of models and the supplies we carry, one might almost call it a "modelmaker's handbook," showing the assortment of materials available on the open market at the commonly advertised and in some cases, lower than usual prices, brought together in one catalog in large quantities. Many, many of the items are made up especially for Cleveland.

Here is just a sample of some of the materials used: die cast ship and solid

model airplane parts; solid metal bits, brasses, aluminum, steel, etc.; motors, several gas model engines; cut bamboo, wood props, in the States, brasses, bronzes, copper, steel, etc.; iron, Silver; and music wire, etc. 24 carat gold, 14 carat gold, 10 carat gold, any other metal simply with the exception of platinum, which is too expensive, than may be molded or cast in solid pieces; inexpensive hand tools, micrometers, calipers, etc., etc.

machinery; the largest assortment

40 Sensational $\frac{1}{2}$ -in. Flying Models

Unbeatable Value in a Mr. Mulligan

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These are precisely like the $\frac{1}{2}$ -in. models—with a few minor exceptions. For coloring—we recommend the same colors as used on $\frac{1}{2}$ -in. design of the same model. Remember DWARF KITS DO NOT CONTAIN ANY LIQUIDS, OR STRIPPING TAPE.

No.	Name	Span	Price
D-1	Gr. L. Sport. Trainer	13 3/8"	\$.65
D-2	Gr. Air. Mystery Ship	14 1/2"	\$.50
D-3	Delta Winged Wasp	14 1/2"	\$.50
D-5	Laird Super Solution	10 5/8"	\$.60
D-8	Army Boeing P-12	15	\$.65
D-10	Boeing (Gullwing)	14 1/4	\$.65
D-11	A-W Quad Fighter	14	\$.65
D-12	Blériot's Nièpport	13 1/8"	\$.50
D-13	Boeing Flying Boat	14 1/2"	\$.65
D-14	Fokker Triplane	11 2/4"	\$.65
D-15	Fokker D-7 Fighter	14 1/8"	\$.60
D-16	Howard "Pete" Racer	10 5/8"	\$.65
D-17	Supermarine S.6B	18	\$.65
D-18	Howard "Pete" Racer	10 5/8"	\$.65
D-21	Harr. P-12 Fighter	14 2/4"	\$.65
D-22	Boeing P-36 Fighter	14 1/8"	\$.65



D-24	Lockheed Vega	20 1/2	\$.65
D-27	De Havilland Goliath	15 1/2	\$.75
D-28	Monocoupe Sportplane	16	\$.65
D-29	Boeing FAB-3	15	\$.65
D-30	Boeing FAB-4	15 1/4	\$.65
D-33	Comper Swift Lightplane	12	\$.30
D-34	Fokker D-7	18 1/2	\$.65
D-35	De Havilland Tiger Moth	16 7/8	\$.65
D-36	Lincoln Sportplane	10	\$.65
D-38	Waco C Cabinplane	16 1/2	\$.75
D-40	De Havilland Hornet	15	\$.65
D-41	Vought Corsair Fighter	18	\$.65
D-42	Howard "Pete" Racer	10 1/8	\$.65
D-43	De Havilland Owl	24	\$.65
D-45	Martin Bomber	28 2/8	\$.65
D-46	Laird Solution Racer	10 5/8"	\$.65
D-47	Boeing T-33	18 1/2	\$.65
D-48	Turner V. Winge	12	\$.65
D-49	Curtiss F1C-2	15 2/4	\$.65
D-50	De Havilland Hornet	16 1/2	\$.65
D-61	De Havilland Hornet	22	\$.65
D-82	"Mister Mulligan"	15 2/4	\$.65

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33 $\frac{1}{2}$ " hull, Farragut's flagship HARTFORD, a steam-and-sail sloop-of-war, with hull lifts sawed	8.45
12 $\frac{1}{2}$ " hull. Privateer SWALLOW, with lifts sawed to shape	4.95
20 $\frac{1}{2}$ " hull, Clipper SOVEREIGN OF THE SEAS, with lifts sawed to shape	4.95
17 $\frac{1}{2}$ " hull, Trading schooner, three-masted	4.90

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Laminated Gas Model Propellers

As described above, but no plate—all true pitch: 14", pitch: 15, 7/8" pitch: 16", pitch: 17, 1/8" pitch: 18", 6" pitch: 19, 5/8" pitch: 20", 5" pitch. Each \$2.75.

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SCORPION MAJOR GAS KIT

Designed especially for Tom Thumb Engine. Span 57". A most complete kit, including pneumatic wheel, precision flight control, ignition switch, finished 13 $\frac{1}{2}$ " propeller, plenty of dope cement, wood, wire and all necessary hardware. Has full size blue print with instructions. Shipped express collect, \$12.50.



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EASY TO BUILD

Single passenger 9 $\frac{1}{2}$ ", \$8.45; paddle 12 $\frac{1}{2}$ ", \$8.45; 7 $\frac{1}{2}$ " passenger 12", \$13.75; 8 $\frac{1}{2}$ ", paddle, \$1.75, F. O. B.: Shipping weight: Single 22 lbs. Two Passenger 32 lbs. Shipped express "collect."



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Purchases may be made direct from this ad if your own dealer can't supply you. Only one 15c packing needed for parts orders regardless of items ordered. (Please mention dealer's name.) Send check, or Money Order—cash at own risk. Canada, Mexico, British Isles, add 10%; all other countries, 20%. RUSH 10c for C-D Catalog No. 20.

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"Tom Thumb," 11 $\frac{1}{2}$ "
"Tom Thumb," 11 $\frac{1}{2}$ "
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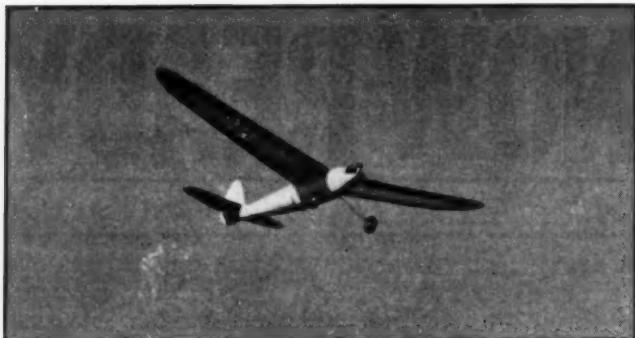
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Pict. No. 2. Joe Snodgrass' Pietenpol. The design of this ship is exceptional from a stability standpoint



Pict. No. 3. A well designed job by R. Knickelbein



Pict. No. 5. Some gas planes at a recent Los Angeles contest. Most of them look like scale jobs



Pict. No. 6. John Mills with his "Miss America"



Pict. No. 4. A very light design by E. W. Radtke

"Gas Lines"

News and Ideas from Gas Model Builders From All Parts of the World. How You Can Register Your Gas Models. A New World's Record

I.G.M.A.A. News

Pict. No. 1. Martin Faynor's Cavalier in full flight at the first I.G.M.A.A. Contest

HERE is some important news about which every member will be pleased to read. Major C. C. Moseley of Aircraft Industries is now a member of the International Gas Model Airplane Association and has been appointed to the Advisory Board of this organization. This board is composed of the leaders of the various units under the I.G.M.A.A. and men who are active and prominent in gas model aviation circles.

Possibly many members will remember that Major Moseley is an old Army pilot who has flown historical machines in many of the speed races. At present he is interested in developing model gas engines.

Other members who have been appointed to the Advisory Board are Mr. William Brown and Mr. Edward Roberts of the Junior Motors Corporation, Mr. J. R. Forster of Forster Brothers company and Mr. Frank Tlush, of Tlush Super Ace Motor Company. All of these men are interested in developing engines for model aircraft and are pioneers in the gas model field.

Many members have been busy snapping pictures of their gas models, a number of which have found their way into Association headquarters. Our first picture today shows Martin Faynor's Cavalier in full flight. Faynor is from Newark, New Jersey. His ship is a beautiful streamlined job with elliptic wing tips. The fuselage is of monocoque construction. A Brown Junior motor powers the ship.

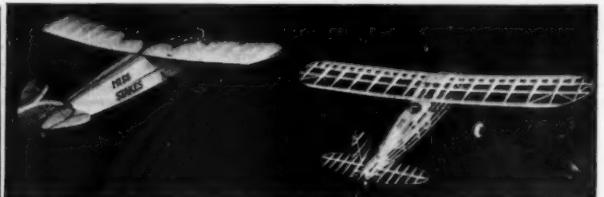
Next we have a picture of an interesting model, picture No. 2, from Joe C. Snodgrass, Jr., of 328 Chesterfield Avenue, Nashville, Tennessee. Snodgrass has

chosen his model type exceedingly well inasmuch as the general aerodynamic design of this ship makes for exceptional stability under all conditions. The wing is parasol, the line of thrust is high and the center of lateral area is low. As experienced builders know, these three characteristics insure stability in our gas job. For further details concerning these features see "How to Design a Fuselage Model," page 23. Snodgrass' ship weighs only 4½ pounds and it is powered with a Forster Brothers engine. He says that the model has an 88" spread with a 15" chord. So far it has made only three short test hops. However, the method of testing models with a string tied to the switch has been used by both Mr. Snodgrass and Mr. Farrar, his friend, with great success, saving the models from a great many crack-ups on numerous occasions.

Mr. Farrar also has a model Pietenpol Aircamper, like Mr. Snodgrass', which has made some fine flights. He tells us that gas model aviation is advancing rapidly in Nashville and soon they hope to have a large chapter of the I.G.M.A.A.

Picture No. 3 of another well designed gas job has been sent to us by Ray Knickelbein of West Bend, Wisconsin, Box 179, Route 5. Knickelbein built the ship about nine months ago and it has a span of seven feet and weighs about 4½ pounds. He used the method of testing, with great success, in which a string has been attached to the tail skid. The job is equipped with an automatic time switch and a booster battery plug which was made from an automobile tail light socket. In this way two large dry cell batteries may be used for starting. When the motor is thoroughly warmed up the large batteries are disconnected and the current flows from the small flashlight cells.

From picture No. 4 it appears that Mr. E. W. Radtke of 3731 North 24th Place, Milwaukee, Wisconsin, has gone radical in his gas model design. This is to be commended inasmuch as it shows in-



Pict. No. 7. Two small gas models by Chas. Pattol and Bob McKee

genuity. The model has a four foot, nine inch span with very marked tapered wings. Although it has little wing area the wing loading is much less than some other models, because it weighs only $2\frac{1}{2}$ pounds. A Brown Junior motor is used with a thirteen inch prop. Mr. Radtke says:

"I test hopped it recently and took off the left wing because it was not adjusted correctly. (He does not say if the wing was taken off before or after the flight. Use your own judgment.) I fixed the damage and am now ready for another flight. The speed must have been over forty miles per hour."

The design of the ship is unique, to say the least. The tail booms are made of solid balsa pieces attached to the wing spars.

Picture No. 5 was submitted by Theodore Dykzeul of Bellflower, California, and shows several gas jobs lined up at a recent contest held in Los Angeles. Over 125 gas models were entered. You will note from the model in the foreground that west coast builders are sticking closely to scale planes. The characteristics of this little ship are proportioned like the full size plane. The cowling of the engine is exceptionally neat.

Mr. John A. Mills of 1 South Person Street, Raleigh, North Carolina, who manages the model airplane department of Lewis Sporting Goods Company, Raleigh, N.C., has been kind enough to send us picture No. 6. It shows him holding his latest gas model, "Miss America." Mills is patiently waiting for an engine to instal in his ship. It has been ordered but has not arrived. Many builders can appreciate his feelings, no doubt.

Some interesting gas jobs are shown in picture No. 7. They were built by Charles Pattol of 387 Santa Clara, Oakland, California. Pattol says that the model on the left won third place at the 1935 California State Fair. It has a six foot span and was built by Pattol and Bob McKee, also of Oakland. He says that the model, though it has little dihedral, is fairly stable. The smaller ship on the right has been covered and painted since this picture was taken and was found to weigh, with the motor, two pounds, five ounces. It has a five foot span.

Pattol wishes to suggest that an I.G. M.A.A. contest be held on the Pacific coast. We feel that this is an excellent comment and steps will be taken to promote such a contest.

Picture No. 8 was not put into this column to bring up unpleasant moments. We feel, however, it may act as a re-



Pict. No. 11. Jim Baugh's and Jack Thompson's models at the Denver Meet

minder to those builders who wish to fly their ships without proper thought and care as to the adjustment that should be made before any flights are undertaken. This pantomime was staged by the builder of the ship, John Bronson, and his friend, Bob Hastings. Both boys live at 311 North 8th Street, St. Joseph, Missouri. The sorrowing builder who lies beside the wrecked ship is Bob Hastings, in case no one can recognize him. The wrecked plane was Bronson's B-1, which looped into the ground after a fast take-off.

Jimmie Daxon of 783 West 49th Street, Norfolk, Virginia, sends us picture No. 9 in which he gives us evidence that he has used some ingenuity. The picture shows his KG-3 which he had modified into a cabin job. The ship weighs seven pounds ready to go and has a wing spread of eight feet and a chord of fifteen inches.

The next picture, No. 10, shows another unusual job. It is Bob File's twin rudder gas job. Bob lives at 502 Seymour Avenue, Columbus, Ohio. He designed the machine himself, which has a six foot span and has made exceptional flights. The ship weighs two pounds, fourteen ounces complete with the motor, which light weight may explain its unusual flight ability. It is powered with a Baby Cyclone. On one flight it flew for thirty-five minutes on half an ounce of gas. Followed by a real plane it was found that it had reached an altitude of 3200 feet, according to the plane's altimeter.

(Continued on page 45)



Pict. No. 10. A fine flying twin rudder job by Bob File which has flown for 35 min.



Pict. No. 12. E. Evans and M. Spickler and their Aerona



Pict. No. 13. Bob Dittmer and his Buccaneer (Denver)



Pict. No. 14. Chas. Pattol and his first successful flying wing. It has flown for five minutes

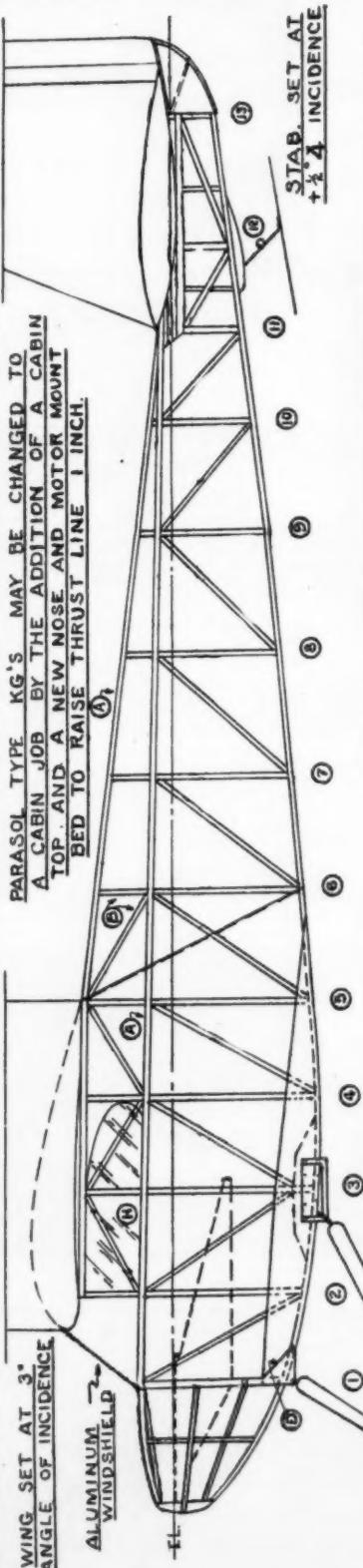


Pict. No. 8. Bob Hastings was stricken with grief when John Bronson's model crashed



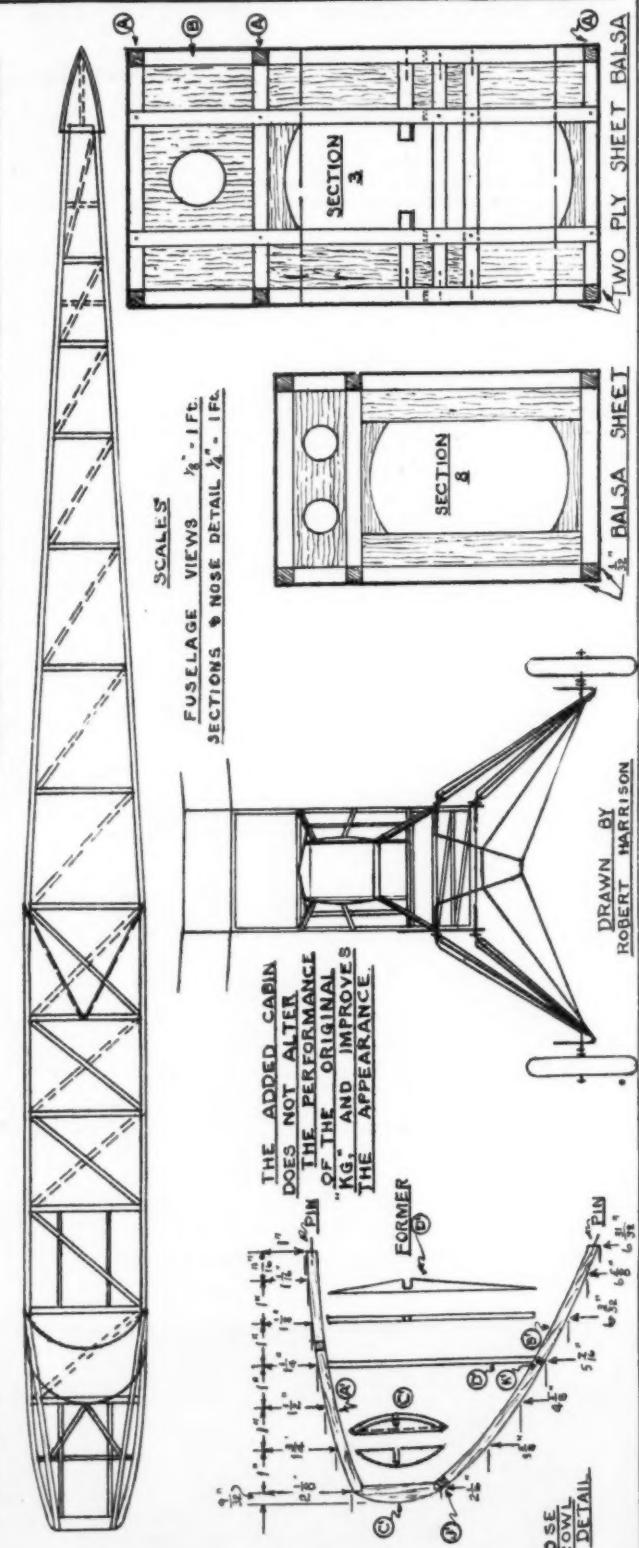
Pict. No. 9. Jimmie Daxon has equipped his KG with a cabin and other improvements

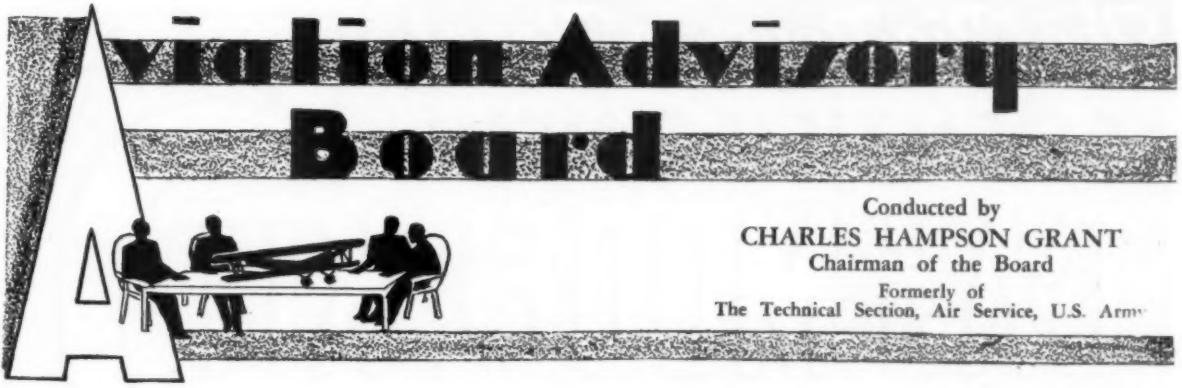
CONVERT YOUR KG TO A CABIN SHIP



COMPLETE PLANS FOR THE ORIGINAL "KG" GAS JOB CAN BE OBTAINED FROM MODEL AIRPLANE NEWS, 551 FIFTH AVE., NEW YORK CITY.

INDEX OF MATERIALS		
A	1/16" x 1/4" x LENGTH	BALSA
B	1/16" x 1/16" x "	BALSA
C	1/16" x 1/16" x "	BASS
D	1/16" x 1/16" x "	BASS
E	1/16" x 1/16" x "	BASS
F	1/16" x 1/16" x "	BASS
G	1/16" x 1/16" x "	BASS
H	1/16" x 1/16" x LENGTH	BASS
I	1/16" x 1/4" x LENGTH	BASS





Conducted by
CHARLES HAMPSON GRANT
Chairman of the Board

Formerly of
The Technical Section, Air Service, U.S. Army

WE HAVE some questions and answers of prime importance this month which may be of help to many model builders. Our first question comes from William W. Saunders of 3913 Chatham Road, Baltimore, Maryland. He asks:

Question: I would like to know why down thrust is used on model airplanes.

Answer: Down thrust is used because of a misunderstanding on the part of model builders. They have the idea that this feature will help stability. This conclusion has been reached by a combination of errors.

It is possible that some advantage may be obtained from a down thrust in respect to the stability of the plane *under certain conditions*. However, on the other hand, stability and efficiency of the plane is destroyed by the use of this feature inasmuch as the fuselage passes through the air with the rear end of it dropped down below the nose.

What the model builder actually is try-

ing to do is to increase the angle of his wings and of the stabilizer. His method of carrying this out has been very clumsy. In effect it gives a positive stabilizer. Usually the model builder sets the angle of incidence of the wings and stabilizer relative to the axis of the fuselage. We will say that he wishes an angle of two degrees for the wing and zero degrees for the stabilizer. He then proceeds to give a negative angle of thrust of two degrees, for instance. By doing this he has increased the angle of the wing to four degrees and the angle of incidence of the stabilizer to two degrees. He starts out by setting definite angles of incidence and then destroys the whole effect by giving a negative line of thrust.

The mistake occurs in the fact that he calculates the angle of incidence of the surface relative to the fuselage instead of relative to the line of thrust. All angles should be calculated from the line of thrust. The proper way to get the

same beneficial effect provided by the negative line of thrust without the detrimental effect is to always have the line of thrust parallel with the axis of the fuselage and then assign the angle of incidence to the wings and tail that may be desired.

One great fault with a negative line of thrust, as used now, is that too great an angle of incidence of the wing exists for efficient performance. The wing should be set at from two to three degrees angle of incidence calculated from the line of thrust. A stabilizer of one degree or one and a half degrees positive, especially in a parasol airplane, will give the efficiency which the model builders are now trying to get by dipping the line of thrust relative to the fuselage axis. At the same time the wing will act in an efficient manner.

For a more detailed discussion of this subject, we refer you to the chapter on (Continued on page 48)

The New Seversky Trainer

THE X-BT (basic training plane shown in the picture) is the only plane that Seversky ever built that has dihedral wings. The wings are straight until they reach the outer wing panel; there they start to slope gently upwards. Two sets of outer wing panels have been constructed of different length; performance will be tested with both sets in order to determine which one is preferable. The canopy and crash protector have been improved over those used in the BT-8. The fully retractable landing gear is equipped with General streamlined tires; hydraulic shock absorbers have been installed in order to reduce impact shock to a minimum.

Retractable landing gear is one of the special features that will not be found in any other training plane in service by the Seversky; instead of being retractable by hand crank alone, as is the usual practise, both electric hydraulic and hand mechanism systems have been installed.

Of the three engines permitted in the Air Corps specifications, the X-BT will use a Pratt and Whitney R-1430; this engine develops 550 hp. normally, but will be "choked" down to deliver but 450 hp.

A two-bladed Hamilton controllable pitch propeller pulls this seemingly low-powered ship through the air at the speed of 220 m.p.h.; cruising speed is 175 m.p.h. With wing flaps in normal flying position, the landing speed is 60 m.p.h. With flaps down the landing speed is reduced to 40 m.p.h.

The flaps, which are also controlled by the electric hydraulic system, are in two separate sections, each section may be operated individually. The flaps are installed under the center section of the fuselage and on the inside section of both wings.

The complete load of gasoline is carried in the fully cantilever type wings, which are built in such a way that the

gas tanks are part of the airfoil. In a ship constructed on this principle if the gas tanks are pierced by bullets, it would not be necessary to remove the whole tank in order to repair the damage. Octane 87 aviation gasoline is the fuel used; between forty and fifty gallons of fuel are consumed per hour. Tabs have been added to the elevator, rudder and the left aileron. With the installation of tabs, it is possible to use a more powerful engine in the plane without changing the center of gravity. The tab on the left aileron is used to offset propeller torque. A full set of instruments is present in both front and back cockpits. An antenna is provided for use with a two way radio.





The Big News is Here! \$

SCIENTIFIC'S NEW

GAS MODEL KIT

At a New Low Price Level!

RED ZEPHYR

ZEPHYR

COMPLETE

**POST
PAID**

6 ft. Wingspan • 56 in. Long • Weight (with motor) 3½ lbs. • Full shock-absorbing Landing Gear



In announcing this new "Red Zephyr", Scientific makes history in the gas model field. On test flights the model has performed beautifully, taking off from the ground unassisted in about 25 feet.

This new Scientific Gas Model has many distinctive features that you would expect to find in kits selling at much higher prices. The full shock absorbing landing gear is equipped with new type brackets. The aero-dynamic design is simple but highly effective and the model is easy to construct.

Other features include: Vibration absorbing motor mount, extra strong nose and low wing loading. It is easy to dismantle and is therefore ideal for contests or pleasure flying. Both the initial cost and upkeep are economical. The model is beautifully colored: White with red and black trim. It is an exceptionally good looking ship, and is

GUARANTEED TO FLY

What the Red Zephyr includes:-

1 pair pneumatic rubber wheels; complete printed out wood including ribs, bulkheads, wing tips, etc.; all strip wood of finest quality accurately cut to size; bamboo paper for covering; rubber; hard wood propeller blank; complete set of hardware including nuts, bolts, heavy landing gear wire; new type landing gear brackets; battery wire; washers, etc.; 1/32" 3-ply birch veneer for covering nose of model; strip spruce for parts needing added strength; large can of gas model cement; streamline tail wheel; complete assortment of numerals, lettering and "Red Zephyr" insignia; 2 giant full size detailed plans giving every bit of information needed for building and flying the "Red Zephyr."

See this New Kit at Your Dealer Today!

**Still Breaking
All Sales Records!**

Miss America

GAS MODEL



7 ft. Wingspan • WL 4½ lbs. • 22 min. on 1 oz. • 18 to 1 Glide

Among features of the "Miss America" model are shock-proof landing gear, landing gear brackets, balance tabs on rudder and stabilizer for correct adjustments of flights, and new type battery box.

The model is beautifully colored, wings being doped a brilliant red and fuselage blue with black and white trim. It is built to accommodate either the Brown or Cyclone engines (or any reliable motor now on the market).

Here's What You Get:-

1 Pr. Pneumatic Rubber wheels, two giant full-size detailed plans streamline tail wheel; wood cement, bamboo paper cement, red, blue and black, dopes; printed-out ribs, bulkheads, wing tips, etc.; special covering material; celluloid; rubber; hard wood propeller blank; complete hardware; 1/32" 3-ply birch for covering front of model; strip spruce; complete insignia, etc.

Composite Kit
(Less Motor)

\$7.50

Postpaid or at Your Dealer

Scientific Model Airplane Company

218-220 M-11 MARKET ST., NEWARK, N. J.

In England: H. & S. Norman, 48 Derby Rd., Kirkham, Preston, Lancs.
In Australia: Swift Model Aircraft, 156 Adelaide St., Brisbane, Queensland.

In South Africa: Stratosphere Model Aircraft Supplies, P. O. Box 3248, Johannesburg.
In France: E. Kruger & Co., 9 Rue St. Sébastien, Paris.

SCIENTIFIC'S NATIONALLY FAMOUS 20" HI-FLYERS

GUARANTEED TO FLY 500 FT.

The Kits That Feature the

BRIDGE-TYPE LANDING GEAR

Popular Models! Easy to Build!

Complete to the minutest detail!

50

C
EACH
POST
PAID
Oral
Your
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GRUMMAN FIGHTER SF-1 50s P.P.



CURTISS P-6E ARMY HAWK 50s P.P.



WACO MODEL "D" MILITARY 50s P.P.



FOKKER D-7 50s P.P.



ART CHESTER RACER 50s P.P.



BEN HOWARD'S "MR. MULLIGAN" 50s P.P.

BUY YOUR ENGINE FROM SCIENTIFIC AND GET A DOUBLE GUARANTEE

Every engine sold by Scientific bears a full double guarantee . . . one from the maker and one from Scientific.



This engine complete with tank coil, timer, condenser; speed from 500 to 4000 r.p.m. Runs 17 to 20 min. on 1 oz. of gas. With each Baby Cyclone, **FREE** 13" Hardwood Propeller.

The Brown Jr. comes to you complete, no extras to buy. Develops 1200 to 10,000 r.p.m. delivers $\frac{1}{4}$ h.p. **FREE** 14" Hardwood Propeller.

SCIENTIFIC'S HIGH QUALITY GAS MODEL SUPPLIES AT LOWEST POSSIBLE PRICES

SCIENTIFIC GAS MODEL FINISHES
Specially formulated for use on gas models. The finish on your model does great things in making a successful gas model. Don't take chances with inferior, low-priced finishes.

CLAY, MICA, DUST COLORED, NITRATE, DOPE NITRATE, THINNER

HEAVY COLORLESS CEMENT
BAMBOO FLOOR CEMENT
BANANA OIL

1 oz. can	15c
1/2 oz. can	12c
1/2 oz. bottle	25c
4 oz. bottle	30c
1/2 pt. can	40c
1 pt. can	75c

STRIP BALSA			
Five Foot Lengths			
1/8x1/8	.03	35c	
1/8x1/4	.04	1/2x1/2	.12
1/8x1/4	.05	1/2x1/4	.12
1/8x1/4	.07	1/2x1	.18
3/16x3/16	.05	3/4x3/4	.15
3/16x3/16	.06	1x1	.25
1/4x1/4	.06	1x1	.35
1/4x3/8	.08		

SHEET BALSA			
Five Foot Lengths			
1/32x2	.10	3/16x3	.18
1/32x2	.10	3/16x2	.18
1/16x2	.12	1x2	.20
1/16x2	.12	1x3	.25
1/8x3	.20	1x3	.35

GAS MODEL Covering Materials		
Bamboo "Airtite" Paper	Finest grade, highly efficient.	Size 24" x 36"
Sheet 10c	3 for 10c	Extremely durable, guaranteed finest quality Japanese silk obtainable for gas models. 30" wide per yd.
Zebra Silk	10c	10c
10c	20c	20c

LANDING GEAR BRACKETS

Simply insert wire landing gear in holes at top of brackets and tighten with screws. Complete with two brackets with screws, 50c.

SPECIAL DESIGNED GAS MODEL PROPS

They are true pitch and designed for use on all scientific models. Made from selected grade hard wood, two sizes 13" and 14". Special \$1.00 each.



KNIFE SWITCHES

Firm Contact,
3 poles..... 35c each

Handy tool; removable sharp 10c
steel blade. Extra blades, 3 for..... 10c

SPECIAL MOISTURE-PROOF HOOK-UP WIRE

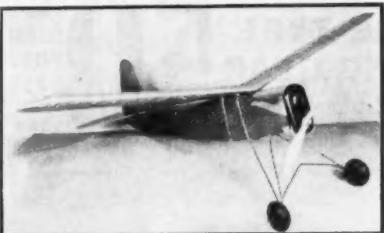
The finest on the market today. Oil, gas and water proof. Price per foot..... 5c

In packages of five feet..... 20c

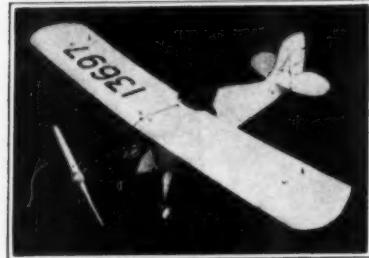
For motor mounts and many other uses. 1/16" thick: 1, 2, 3 foot lengths..... 15c

8 $\frac{1}{2}$ " x 8 $\frac{1}{4}$ ", per foot..... 25c

AMERICA'S FINEST GAS MODELS

**\$4.85 The Scout \$7.25**

A good rough weather flyer. When others have to put their ships away because of wind your SCOUT is flying at its best. Designed for the 1936 Cyclone. The spectacular climb of this ship makes it the main attraction wherever flown. Plans show two wings, regular 54" and the 48" speed wing. Kit with bamboo paper and Sponge rubber wheels \$4.85 postpaid in U.S.A. With silk and air wheels \$7.25 postpaid in U.S.A.

**The CORBEN**
Wing Span 70 Inches

432 flights on one ship without a crack up. Engineering? The best. Flying ability? In a recent contest CORBENS took second, third, and fourth. Rated AMERICA'S NUMBER 1 service model. We couldn't improve the ship so we improved the kit. Besides having silk, air wheels and a finished prop, we have added colors, thinner, wire and switch. Nothing more to buy but your engine and batteries. Cyclone, Brown or any similar engine may be used. Kit \$12.75 postpaid in U.S.A.

GAS MODEL SUPPLIES

14" Brown, 18" Cyclone pine prop \$1.25. Hardwood prop \$1.50. Spark plug .75c, 3 1/4" air wheels \$1.25 pr. Best silk 50c yd. 3/32 & 1/4" O.D. Straight Music wire, aluminum sheet and tube, dural wire, No. 70 oil Cyclone parts, Special 17 amp. 3.2 volt, 4 1/2 oz. batteries \$1.00. Gas model, dope and cement. Switches 20c. Unvarnished hardwood props, 18" or 14" \$1.00. Write for list.

CYCLONE ENGINES AND PARTS IN STOCK FOR IMMEDIATE DELIVERY. DEALERS: LIBERAL DISCOUNT ON ONE KIT OR MOTOR. We have a complete line of model supplies, also kits priced from 10c up. 71 kits in the MODEL CRAFT and Pacific line. Fastest selling kits and supplies because we have what the largest number of builders want, that's why

MODEL CRAFT

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LOS ANGELES, CALIF.
is the Lending Model Supply House of the West



SEE PAGE 1

FLY - WEIGHTING!

Now every model you build, whether flying, solid or boat, can be lighter, neater, and win awards! The time and money saving SPECIAL Balsa-Sandee makes lighter, better-flying models that look like the pictures, without slow, uncertain hand-sanding. Use hand or motor power; adjustable sanding. Improve your next model by mailing a dollar NOW (or C.O.D.). Sandee rushed postpaid. Only \$1.00 complete Postpaid.

SKILLKRAFT, Room 404, 2409 Surrey Ct., Chicago, Ill.

**How to Put "Revs" Into Your Gas Motor**

(Continued from page 9)

contributing to the successful operation of the two-cycle engine is probably the most neglected, and is most always left to the last minute. For instance HOW MANY OF YOU BUILD BEAUTIFUL AIRPLANES, THEN GRAB ANYTHING THAT WILL SERVE AS WIRES? Fellows then wonder why their motors will not function properly, but how can they if they use house fixture wire.

The first thing to do is to go to any radio supply store and purchase a few feet of stranded wire that is used for radio hook-ups, etc. This wire is ideally suited for our purpose. A good idea is to purchase wire of different colors. For instance, you can use red wire for the high tension wire which leads to the spark plug; yellow wire leading to the breaker points and green wire for the battery terminals and ground connections. In this way you can see with a glance the condition of the wiring without having to first untangle the wires to see what's what, and then you are not sure if everything is in its right place. For an added precaution radio spaghetti can be used for insulating your wires. This bit of added work is liable to save you plenty of trouble, so why not make it a feature in your wiring.

When you cut wires, cut them to correct lengths so that there will be no danger of tangling in case your model should have a rough landing, or when you turn over the model to empty the gasoline tank. In cutting your wires make sure that the ends do not become frayed. An easy way to prevent frayed ends is to sweat some solder over the ends, then get some shellac or dope and brush the insulation where it was cut. This will insure clean and tight connections. Avoid sharp kinks in the wires so that there will be no danger of broken wires. A switch should be provided between the ground wire so that you may be able to close the circuit when the plane is not being used. This little feature will save you plenty of trouble, in that it conserves your batteries, and most of all saves your coil from any possible break down.

Your spark plug should always be kept clean. A fouled plug will never give proper results so essential in the performance of your engine. A simple but efficient way for keeping your plugs clean is as follows: mix equal parts of ammonia and water. Let the spark plugs soak in the solution until the carbon flakes off. Never use sandpaper or other abrasive materials. They scratch the porcelain, thus making the spark plug easy fouling.

The coil which is not the most important piece of apparatus needed in the operation of the engine should be treated like your best friend. When the coil is not being used, store it in a dry place. When it is being used in the ship, mount it in a place where oil will not reach it. If the coil becomes soaked with oil, there is a possible chance of it becoming grounded.

Without batteries your engine will

never run no matter how perfect everything else is, so it is with dead batteries which are just as useless as no batteries at all.

When you purchase batteries, make sure they have plenty of amperage. Take along an ammeter to check the amperage. Sometimes the batteries may have the voltage, but this alone will not run your engine. The batteries should have about twenty amps.

Successful Operation of Your Motor Depends on Good Neat Wiring

The use of gasoline as a fuel brings up many points which should be remembered. For instance the care which we should take buying the fuel, mixing it, pouring it into the gasoline tank, and above all the quality and care in using it on the contest field.

All some fellows worry about is that the stuff smells like gas and looks like oil, never giving the quality and type a second thought. These factors all contribute to the long life of your motor and if not taken care of, your motor will not give the service it is supposed to give. Gasoline of the highest grade should be used only. Of course do not use fuels that are treated with chemicals, because they are liable to ruin the cylinder walls.

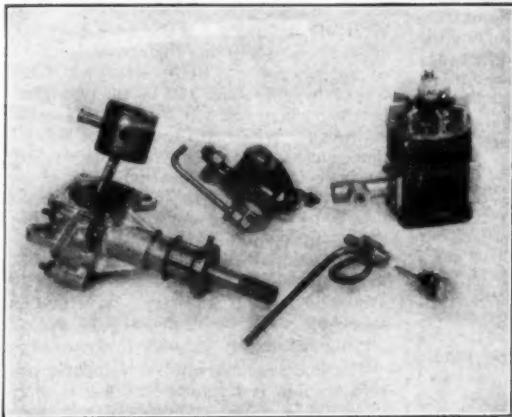
The type of gasoline best suited for these small engines is a fairly slow burning gas. The author has found that a gasoline with an octane rating of about 79 will give the best results. If a higher octane gasoline is used in the motor, results will not be as good as you might expect. The faster burning gasoline will have a tendency to pre-ignite and your engine will have a noticeable pinging sound, with a consequent loss of power.

The lubrication of these motors should be looked into. The deciding factor for good lubrication is the high speed at which these engines operate. You know that no engine will last long if it is not lubricated properly. So figure it out, a motor operating at 4500 revolutions per minute, and the amount of oil that is mixed with the gasoline which is supposed to lubricate the walls of the cylinder and piston plus all the other moving parts is very little indeed. It certainly is not so difficult to visualize what damage a poor grade of oil can do to the engine. The operating temperature of the engine is fairly high, running from about 250 to 350 degrees fahrenheit. A poor grade of oil at this temperature will burn and form excessive carbon deposits and no lubrication, whereas a good grade of SAE 60 or 70 oil with a paraffine base will not crack or burn under the high operating temperatures. It will also form a perfect lubricating film of oil on all the moving parts. Carbon deposits will be reduced to a minimum and the life of your engine will be increased tremendously.

The majority of the fellows follow the instructions which are given them by their engine manufacturers, but when they get on the contest field they become very careless with the gasoline. They either forget the instructions or become so excited thinking about the world's record that they may break, that the gasoline is just poured into the tank without care. When their engine refuses to run

G. H. Q. GAS MOTOR KITS

Last Chance-offered up to Nov. 15 only!



This is actually one of the most startling announcements ever made. Only five months ago, G. H. Q. blazed new trails in model airplane history with the news that a super-power engine may be had at \$8.50 for a limited time only. Thousands of delighted men and boys availed themselves of this unusual opportunity since that time. We have decided therefore that we are now at liberty to withdraw this temporary offer and discontinue the delivery of all G. H. Q. gas kits after this month—selling finished motors only thereafter.

Here is your last chance to obtain the G. H. Q. Motor Kit, an engineering triumph—accomplished only after years of scientific aero-dynamic research. Thousands of letters have poured in from all parts of the country praising and recommending this mechanical achievement and the thrill of a lifetime will be yours with this motor kit—one of the most powerful ever constructed. Has broken records for amazing performance—flies model planes up to 10 ft. wingspread. Also used for boats and stationary use. Easy to start and simple as ABC to assemble—average assembly time is only 45 minutes. So easy only a screw driver is needed.

Everything is in the kit including plug, coil, condenser, tank, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, etc. Every part is fully machined and finished. No oil, gas, batteries or propeller included. Postpaid for only.....

\$8.50

AND THESE FEATURES MAKE THE G. H. Q. MOTOR A WINNER!

1. Easy starting—just a twist of the wrist.
2. Steady running—as long as gas, oil and spark are supplied.
3. Motor cannot overheat.
4. Precision parts.
5. All parts replaceable.
6. Cylinder and piston lapped to within .0003.
7. Accurate die castings.
8. Crank shaft balanced and perfectly machined.
9. A light spark coil that is oil, water and gas proof.
10. Coil will not overheat or short circuit.
11. Main bearing is high-speed bronze, ground and lapped to size.
12. Condenser is gas, oil and water proof.

13. Cylinder and piston inspected cast iron to insure long life.
14. Chrome nickel steel shaft with $1\frac{1}{4}$ " bearing surface.
15. Connecting rod of high speed bronze.
16. Carburetor and assembly accurately designed and made.
17. Needle valve and valve body machined together.
18. Breather assembly compact, foolproof, long wearing, replaceable and adjustable.
19. Easily inverted and runs in either direction.
20. Motor starts and runs on 2 ounce battery.
21. Speed range 500 to 10,000 R.P.M.
22. Low gas consumption—runs 27 minutes on one ounce of gas.
23. Strongest miniature motor.
24. LOWEST PRICE EVER SET.

READY-TO-RUN G. H. Q. GAS MOTOR

The famous G. H. Q. motor, entirely assembled on stand. Tested and run before shipment—Performance guaranteed—1/5 horsepower at 3000 to 7000 R.P.M.—No oil, gas or batteries included. Postpaid for only

FREE with every finished motor, 1 finished flywheel mounted on motor. This offer not for dealers.

HERE IS NEWEST G. H. Q. SENSATION!

The G. H. Q. Sportster kit especially designed for G. H. Q. Gasoline Motor but may be used for any other motor of like weight and power. Built according to scientific aero-dynamic principles — Has made hundreds of successful flights without crackup—Marvelous glider ... And what a climber!



A complete kit of all parts including plan, all wood, wire, wheels, metal and all other parts. Postpaid for only

\$5.00

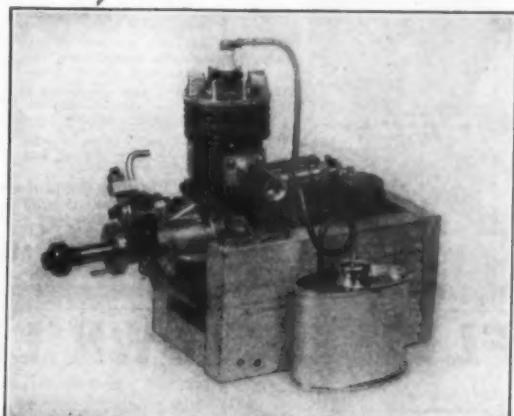
Send 3c for illustrated catalog of gasoline motors, gasoline planes, gasoline accessories and parts

We have a complete line of kits from

10c to \$1.00

A Guarantee

G. H. Q. machinists have successfully constructed hundreds of finished motors from the kits without having any motors which did not operate satisfactorily. Should any purchaser be unable to assemble a working motor he may return parts to us with \$4.50 (charge for assembling and postage) plus cost of any damaged and missing part. Finished motor will be shipped in a few days.



GAS MOTOR ACCESSORIES

Spark Coil (Non-overheating)	\$1.50
Spark Plug (24- $\frac{1}{2}$)	.75
Condenser	.10
Wheels Hub (1 $\frac{1}{2}$ " I.D.) per pair	.50
Propeller	1.50
Flywheel	1.50
Batteries (special 2 oz. 4 $\frac{1}{2}$ V.)	.50
Gas Tank (1 oz. streamlined)	.10
Widget Switches	.35
Propeller Blanks, 14" diameter, 8" pitch	.25
Engine Instruction and Assembly Booklet	.10
Bamboo Paper, 2 sheets for	.15
Silts (special for gas jets), sq. yd.	.45

G. H. Q. MODEL AIRPLANE CO.

854 East 149th Street
NEW YORK, N. Y.

as they are. All you have to know how to do is to be able to recognize various symptoms of motor troubles.

Trouble Shooting

To be able to shoot trouble successfully and systematically, it is necessary to know:

1. The general design of the motor, distributor, and the carburetor.
2. Degree of vibration at various speeds.
3. The correct spacings of the spark plug electrodes.
4. The correct spacings of the distributor contacts.

There are two main sources of trouble:

1. Carburetion.
2. Ignition.

It is wise then to be able to recognize various symptoms of troubles. The following chart of motor troubles should help you in analyzing and rectifying the troubles before successful operation may be had.

Motor Refuses to Start

Sources of Trouble.

A. Carburetion.

1. Motor not primed.
2. No gasoline in cylinder.
3. Needle closed.
4. No gasoline in gas tank.
5. Gas line clogged. (Clean line. If necessary remove tank and clean.)

B. Motor Flooded.

1. Needle opened too much. (Close needle, remove plug, turn upside down and pump out the gasoline.)
2. Too much gas being drawn in without any spark occurring. (Clean spark plug, check batteries and connections.)

C. Ignition—Weak or no spark.

1. Weak batteries. (Test for amperage.)
2. Spark plug fouled. (Clean and adjust electrodes.)
3. Check contacts.
4. Check connections. Check if loose.

Analyzing Trouble

A. Short Fast Run.

Open needle for more gasoline. Check for loose connections and low batteries.

B. Slow Running.

Too rich a mixture. Close needle. Test for good spark. Motor has too much gas in crankcase. Flooded.

Build and Fly The Poter 37R-2

(Continued from page 17)

leading edge is of bamboo that is a little thicker than that used for the trailing edge. When both the rudder and elevators have been completed, cover them with tissue and dope lightly. Allow the dope to dry and then glue the elevators to the base of the rudder. The entire tail unit is then glued to the tail boom as illustrated in plate C. We also construct the tail struts that appear on the same plate and glue them to the tail boom and elevators.

Wing Construction

It is now necessary for us to construct the wing. The ribs appear on plate C and

THE FINEST MINIATURE MODELS IN THE WORLD OUR LEADER!

SELLY-TEX MOULDED PAT. APPLIED FOR CONSTRUCTION KITS NEW AERONCA

16" Wing Span
50c
Postage 10c

These sensational new type moulded SELLY-TEX authentic Flying Scale Model stand supreme. They are the first outstanding development in all model history. They build better and more realistic looking models and can be assembled in half the time it would require to build the old-fashioned balsa-stick-type of construction kit.

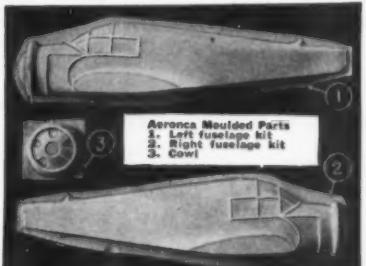
WHAT IS SELLEY-TEX?

A new finely woven processed material, that is moulded in the form of stiff hollow shells, reproducing in perfect detail, fuselages, cowl, motors, pants, bombs, etc., that are supplied with each kit. It is extremely light in weight and practically crashproof. A SELLY-TEX fuselage is twice as strong and half the weight as an all-balsa-stick-type fuselage of the same size and detail. A beautiful finish can be had with either colored dope or lacquer. Choose any Selly-Tex kit and you will find that it is the easiest to build and the most authentic model ever produced.



THE LEADER OF ALL MODEL VALUES!

This snappy low wing model is simply incomparable. Beautifully designed, authentic in detail and a wonderful flyer. The fuselage and cowling are perfectly moulded from crashproof SELLY-TEX material, as illustrated below. Each kit is complete (nothing else to buy) with the finest quality materials and parts.



Each of the SELLY-TEX Construction Sets contain the necessary individually designed moulded scale parts similar to those shown above.

YOUR PROTECTION

All Selly-Tex kits are sold with our unconditional guarantee that the kit may be returned if unsatisfactory and your money will be refunded immediately.

VOUGHT CORSAIR, JR.

Wing Span 16"
Length 13 1/2"



125
15c Postage

REARWIN SPEEDSTER

Wing Span 16"
Length 10"

SELLY-TEX



75c
15c Postage

BELLANCA SWOOP

Wing Span 20"
Length 11 1/2"



100
15c Postage

CURTISS OSPREY

SEND 5c
FOR SUPPLY
CATALOG

125

15c Postage

SEND YOUR ORDER NOW !!

Free!

With supply catalog our new beautiful, two-colored broadside illustrating in detail the new line of incomparable lower price SELLY-TEX Construction Sets. Send 3c stamp for postage.

MANUFACTURERS OF THE LARGEST AND MOST COMPLETE LINE OF MODEL BOAT, AIRPLANE FITTINGS, SUPPLIES AND ACCESSORIES IN THE WORLD.

DEALERS—JOBBERS!!

Be the first to stock these new SELLY-TEX moulded kits. Immediate delivery. SEND YOUR ORDER TODAY. Don't wait.

DEALER'S NAME _____

SELLY MFG. CO. INC.

DEPT 311 1373 GATES AVENUE, BROOKLYN, N. Y.

a bit of weight or by warping the controls. Once the model is properly balanced, you may fly it to your heart's content. It will prove a very stable little ship and probably surprise you with its endurance. I would suggest however, that you examine the ship after every landing it makes. In this way you will be able to discover if any damage has been done and repair it before the next flight. If you practice this, you will be able to enjoy your model much longer and it will give you many hours of extra flying thrills.

Will England Dominate the Airlines?

(Continued from page 8)

carries six passengers and crew of two at 165 m.p.h. cruising on the power of two 310 hp. Siddeley Cheetahs. The Bristol 143 transport which also had a military version, the Blenheim bomber, carries a little more than the Ava, but being powered by two 550 hp. sleeve-valve Bristol Aquilas; the top speed is over 250 m.p.h. as compared to the Ava's maximum of 195 m.p.h. Unfortunately, the Air Ministry's orders for the military counterparts have not allowed these companies to produce many of the civil type and only a very few are used commercially as yet.

One of the pioneer twin-engined transports was the Airspeed Envoy and its performance greatly encouraged designers to try the monoplane formula. In its latest version, the Envoy carries six to eight passengers as fast as 211 m.p.h. It can be equipped with various radials giving a total horsepower range of from 400 to 600 hp.

Two of the latest twin-engined transports to carry six passengers are the Miles Peregrine and the British Aircraft Manufacturing Co.'s (B.A.) Double Eagle. The Peregrine travels at 188 m.p.h. on two 200 hp. Gipsy Sixes. It is a low-wing monoplane built of wood. The Double Eagle is a mid-wing monoplane which is still undergoing tests. It has a remarkable performance for its two 130 hp. Gipsy Majors.

Ten to twelve passenger monoplanes were the next to be designed. The two best examples yet produced are the Blackburn H.S.T.10 and the Monospar Croydon. The H.S.T.10 is powered by two 350 Napier Rapiers and carries 12 passengers with a crew of two. It is designed to do over 200 m.p.h. The Croydon has two 450 hp. Pratt and Whitney Wasp Juniors, is a 12-seater, and has a top speed of 203 m.p.h.

These ships, as can be seen, have shown what can be done by careful designing. The speed has been boosted up with practically no change in power. They should make the schedules of the internal airlines of Great Britain compare favorably with those of any in the world.

So far, only the machines used by the internal airlines have been considered. Imperial Airways, as the chief external airline connecting England with the rest of the world, has much more traffic to handle and has had to maintain machines of much greater capacity. All of their ships on the main routes have four engines because of the greater average size of the machines and also because of the increase in safety which this arrangement provides. The Handley-Page 42 airliners, carrying as many as 38 passengers with crew, have

maintained for over four years a steady service in Europe and the Middle East. Armstrong-Whitworth Atlantas, with capacity for 17 passengers, for about the same period have served in tropical Africa and India. DH86s are used between Singapore and Australia. Because of the large size of the machines, economy prevented Imperials to replace them until they had paid for themselves. That time has now arrived and has been hastened by the stiff competition of the Dutch K.L.M. with their Douglas and the fast service of Air France. Imperial Airways have therefore ordered an entirely new fleet.

The first ship to be ready is the Canopus, the first of the twenty-eight Empire flying

boats ordered from the Short Co. This ship is a clean, unbraced monoplane powered with four 920 hp. Bristol Pegasus engines with variable-pitch propellers. It is of all-metal construction and has a new sliding-type wing flap. It exceeds 190 m.p.h. and cruises at about 160 m.p.h. It carries 24 passengers in four exceptionally roomy saloons with a crew of five. A very noticeable feature of the boat is the large compartments provided for mail. In a few years the British expect to send all first-class mail by air without surcharge. The Canopus is to shortly begin regular service on the Mediterranean; the second ship, the Caledonia, will have special tanks fitted for trans-Atlantic service, and the third, the

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easily made from strip balsa, using a razor blade for cutting.

The pilot enclosure panels may be made of a fine grade of cardboard joined together with cement. Cellophane may be used as windows. Take plenty of time and be accurate.

The loop antenna for the radio direction finder shown on plans may be made from a flattened piece of copper wire. This is to be located inside the pilot enclosure between the two cockpits, as shown in side elevation of the fuselage. The landing hook underneath the fuselage may also be made from wire.

Go over all the parts of the model when they are completed with fine sandpaper. Brush off all dust and begin the paint job. The fuselage should be painted white, including the landing gear. Paint the prop silver and the rest of the model yellow. Apply many coats of dope until a smooth finish is obtained. Wait for the first coat to dry before applying a second. After all parts have dried thoroughly, begin the assembly of the model.

First join the wings to the fuselage. Lay the fuselage in flying position on a level surface and join the two lower wing sections, using plenty of cement. When the joints have dried connect the four small wing struts of center section to fuselage. Then join the upper wing to these with blocks under tips to hold wing in place. Cement the "N" struts in place and go over all connections once more with cement.

Cement the tail units to fuselage very accurately and then begin to build up the landing gear. Lay the model on its back and securely cement the struts to the fuselage. Use a small piece of wire firmly injected into the strut joints as axles for the wheels. Connect landing hook, which is used for landing on aircraft carriers to stop the plane from rolling too far, and also the tail wheel.

Join prop to nose of fuselage using a straight pin as a shaft.

Use black thread for radio antenna and flying wires. Connect with cement. Touch up all connections with dope and the model will be completed.

Air Ways—Here and There

(Continued from page 23)

AIRPLANE News, entitled "How the Airplane Was Created" have been of great help.

New Zealand

Mr. Gordon P. Smith of Brougham Street, New Plymouth, who is manager of the New Plymouth and Taranaki Union Model Flying Clubs, sends us picture No. 9, which shows the newly formed Hastings Club with some of the Napier model builders present. Mr. Williams, who is standing fourth from the left, is president of the club. Mr. Smith says:

"The majority of builders over here in New Zealand are boys, about 89½% of them."

This is pretty close figuring. Unquestionably as gas models become more popular, the older people will become interested in this sport. Mr. Smith says that it is winter over there now. Though they have no snow the weather is unsettled and no

active flying is indulged in. Indoor flying is not done because of the lack of suitable buildings.

England

Mr. H. Clark of 62 Cambridge Street, Newcastle-upon-Tyne, has been kind enough to send us picture No. 10, which shows the members of the Newcastle Model Aero Club. This club has been in existence for five years. Mr. Clark is secretary and treasurer. An exhibit was recently held in which some fine trophies and prizes were given. The picture shows some of the winners examining a very beautiful model of the "Hawker." The exhibit was the third annual one and was held for the benefit of a local charity fund for children. It raised about \$100 for this purpose. About 3000 people attended the exhibit. Outdoor flying models, scale flying models and non-flying scale models were shown. They totalled about 250 entries.

Back of the group of boys in the picture can be seen part of the nose of a full size sailplane which was loaned by the Newcastle Gliding Club.

Mr. C. S. Rushbrooke of 14 Ennerdale Drive, Ashton on Mersey, Sale, Cheshire, sends out a call for help. It appears that he has been flooded with mail from other builders and has not been able to answer the letters. He writes us and asks us to apologize for him for not having answered his mail. He says he has to work for a living part of the time, and to reply to all he would have to give up business and engage a secretary!! He wishes to thank all those who have written him.

Germany

It is not often that we have news from Germany. Therefore, it is with interest that we hear from Mr. Herbert Walther of Bendorf Rhein, Nordstr. 12. He tells us that German model builders are under a great handicap in Germany. Balsa wood had been introduced successfully and the construction of models was beginning to progress when a regulation was passed prohibiting the use of foreign material for contest models, whereupon the builders continued their former conventional methods, using hard wood, bamboo and paper. We do not believe that the German model builders will lose anything by this procedure, inasmuch as greater difficulties bring out greater ingenuity. Fine flights have been made with these machines and it is evident that methods have been worked out which help to overcome the handicap of heavier materials. Mr. Walther would be pleased to hear from any other model builders.

Philippine Islands

We hear with great interest of the first model airplane club to be formed in the Philippine Islands. Mr. G. B. Carty of



SEE PAGE 1

730 A. Mabini, Manila, writes and gives us some interesting information concerning it. He says the club was formed on May 22, 1936, at Manila, for the purpose of instructing its members in aerodynamics, theory of flight, etc. Mr. Carty is a sponsor and purchasing agent for the club. Mr. William H. Pratt, one of the faculty of the Far Eastern School of Aviation and Mr. C. D. Lambert, Technical Advisor for the Aerodynamics Division of the Philippine Constabulary are the other sponsors. Mr. Carty has been connected with the U. S. Army Air Corps at Nichols Field, Rizal, P.I., and is also a member of the U. S. Federal Civil Service, U. S. Army Air Corps. The club would appreciate hearing from other model builders.

CLUB NEWS

Vancouver

Mr. Frank Jones of 1060 East 20th Avenue, Vancouver, B.C., Canada, has been kind enough to send us picture No. 11, showing a very neat model airport which was constructed by the boys of the S.O.E. Flight of the Model Aircraft League of Vancouver. This carried off first prize at the annual air show held at Vancouver on August 1st.

Charlotte, North Carolina

Picture No. 12 shows Donald Kinsey, a member of the Charlotte Model Airplane Club, holding a model of the Taylor Cub which he constructed. He is standing beside a full-sized Cub. We are indebted to Robert White of 1212 South Mint, Charlotte, North Carolina, who sends us this information. He is Captain of the club.

Jacksonville, Florida

One of the active clubs of the south is the Jacksonville Model Club. The club has a charter from the National Aeronautic Association and contests have been held regularly under the direction of Mr. William L. Timpone. This club at present has a large list of members and is well organized. They would appreciate hearing from others. Address them at 2048 Roselle Street, Jacksonville, Florida.

New York City

The National Air Reserve of 114 West 16th Street, New York City, staged a large contest at Rochester, New York, on July 11th. We regret the delay in publishing this notice. This contest was held under the joint sponsorship of the N.R.A. and the Rochester "Times-Union," at Edgerton Park. Forty contestants were entered and eighty-four models flew in the events.

Boston, Mass.

Mr. A. L. Lewis, editor of "Wing Overs," writes and tells us that he will be glad to send copies of the weekly, free of charge, to anyone who writes in for them. They should address him at Junior Aviation League, Jordan Marsh Company, Boston, Massachusetts. Those who are not familiar with "Wing Overs" will enjoy the technical supplement to the magazine which has been added recently.

The Club has been a leader in the model field for about 11 years.

NOTICES

Various Clubs

Following is a list of additional clubs and their addresses which are active in model airplane work:

Gerritsen Model Engineers, 109 Beacon Court, Brooklyn, New York.

Atlanta Model Airplane Club, 64 Broad Street, N.W., Atlanta, Georgia.

DuPage Aero Club, Westmont, Illinois.

Central Model Aero Club, 433 Center Street, Stevens Point, Wisconsin.

Young Men's Christian Association, Fourth and Pine Streets, Pittsburgh, Kansas.

Contest Results

One of the largest events in the middle

west that was held recently was the Oklahoma State Fair Model Airplane Contest, which was held on October 4th. As yet no results of this contest have been sent to us. They will be published in the coming issue.

Look also for news and results of the Mississippi Valley Contest, which was sponsored by the Stix, Baer & Fuller Model Airplane Club, of St. Louis, Missouri.

Air Ways Club

Unquestionably many of our readers will want to know more details of the Air Ways Club. This organization is an association of model builders and model building clubs who have for their object the advancement of model aviation and the increase of knowledge concerning all phases of this

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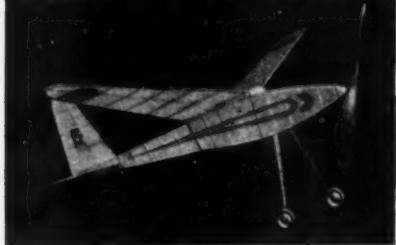
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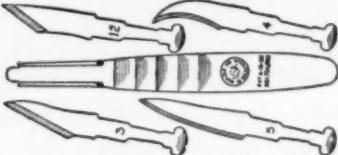
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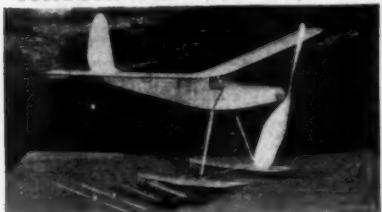
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The Aero-Glide has made flights up to 10 minutes and is capable of doubling this time under favorable weather conditions.

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This model equipped with Free-Wheeling Prop. Wing span 36", length 27", wt. 2.8 oz. The new "Space Conqueror" Hydroplane, Landplane and Skiplane—all in one model—change from one to the other in two minutes. This model has an unofficial record of 19 min. 25 sec., 2500 ft. altitude with M & M Model Wheels. And two to three minutes with pontoons and skis. It takes off just like a real plane, is very easy to build, and the flights it makes are really amazing.

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constructive sport and hobby. Their purpose also is to develop and pass on to other club members new ideas and information concerning model design, building and flying, in order that through this activity, they may attain a complete knowledge of things aeronautical.

Who May Belong

Any model builder who is sincerely interested in model planes may belong to this club, either as an individual or as a member of a unit. A unit of the Air Ways Club may be any club which is already formed and operating, or any group of model builders may get together and form a unit if the number of members in the unit is five or more. There are no special dues, rules or laws which units or members must follow. The Air Ways Club is merely an association of clubs. Any club or unit may operate under its own laws and dictates, holding its meetings and continuing its activities as it sees fit. However, the association reserves the right to expel any club who is not a credit to the association in respect to its behavior and in the manner in which it carries on its activities.

It will interest club members to know that the Air Ways Club is establishing a beautiful silver trophy for the greatest flight duration for all rubber-powered models, irrespective of model type. This trophy will go to the Air Ways Club member establishing the greatest duration under the National Aeronautic Association rules after September 1, 1936.

All model clubs who are not units of the Air Ways Club are invited to join, also any individual model flier who is interested in this art. All that is necessary is to write in for an application blank or fill in the application which appears at the bottom of this column. It is desired by the Air Ways Club to make this organization one big brotherhood. News of interesting activities will be published in the Air Ways columns in future issues of MODEL AIRPLANE NEWS. Join Now.

How to Design Your Fuselage Model

(Continued from page 11)

The outline shown in Fig. A is that of the stability model discussed in preceding pages of this series of articles. All its characteristics insure stability. The high wing and large dihedral provide lateral stability. The short nose, narrow wing chord, reasonable tail movement arm and stabilizer area, and the low C. of G. due to heavy wheels give longitudinal stability. Incidentally with the short nose the wheels would have to be heavy in order to balance the ship. The short nose and the generous moment arm and fin area insure directional stability. Spiral as well as longitudinal stability is produced by the high line of thrust relative to the side area of the fuselage and by the large distance between the Center of Lift and the Center of Gravity. A flat glide is induced by the fact that in a model of this outline shape the center of gravity is below the line of thrust.

Now let us consider the outline shown in Fig. B. It is the same as the one shown in Fig. A except that the wing has been raised so the outline is one of a model of the extreme parasol type. Such a model would have exceptional stability, laterally, longitudinally, directionally and spirally. However, due to the wing being raised, the center of gravity would be higher and at a point approximately on the line of thrust. Thus the glide would not be as flat as in the case of the model represented by Fig. A unless the stabilizer is given a positive angle. In other words the stability would be excellent, possibly a little greater than in model (A) but the glide would be sacrificed.

Fig. C represents the outline of a ship that might be used for duration contest purposes. This model is similar to model (B) only in the fact that it is a high wing. The fundamental difference lies in the long landing gear. The wheel area being lower than in the case of models (A) or (B), the center of lateral area consequently will be lower. Therefore the center of gravity may be lower, which allows the line of thrust to be dropped. In fact, the C. of G. is lowered by dropping the propeller and motor to a line just above the center line of the fuselage. The nose is longer than the models shown in (A) and (B). This indicates that the wheels are comparatively light, the weight of the longer nose creating proper balance, rather than the weight of the wheels producing this condition.

The lateral and spiral stability of such a plane would be excellent, but its longitudinal and directional stability would be impaired by the long nose unless the tail surfaces were enlarged to compensate for this fact. Even under these conditions the "recovery" from displacements would be slow in the case of a model of this type. In general, however, the longitudinal and directional stability would be fair. Such a model type would be excellent for duration because of the long fuselage which would allow the use of a long motor and because a propeller of large diameter could be used.

Fig. No. D shows the outline of a model which is identical with the ones shown in (A) and (B) except that the wing rests directly on the top of the fuselage.

The characteristics of this plane depend

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entirely upon the amount of "dihedral" given to the wing. If the wing of such a ship is provided with the same amount of dihedral as models (A) and (B), then the longitudinal and lateral stability of model (D) would be less than in the case of planes (A) and (B) and would be only of fair degree. The directional and spiral stability would be excellent.

If the dihedral of the wing of model (D) is made greater, so that the longitudinal and lateral stability of (D) is equal to that of (A) and (B) due to the increased distance between the C. of L. and C. of G., then the center of lateral area would be raised considerably above the C. of G. and the spiral stability of the plane consequently would be less. However, the glide of this type of model should be excellent.

The outline of the model shown in Fig. (E) is the same as the outline (D) except that the line of thrust has been lowered. Like model (D), the longitudinal and lateral stability is only fair with a normal dihedral angle used in the wings. These characteristics, however, are slightly better than in model (D) due to the fact that the propeller and motor are lower and consequently the distance between the C. of L. and the C. of G. is greater. But due to the lowering of the C. of G. the center of lateral area now lies considerably *above* the C. of G. This causes the spiral instability to be poor.

If the dihedral in the wings is enlarged in order to make the value of the lateral and longitudinal stability exceptionally large, the center of lateral area will be raised still farther above the C. of G. with a consequent increase in the spiral instability. The glide and directional stability will be excellent in either event.

Many gas powered, as well as rubber powered, models are made with an outline similar to type (E) with a large dihedral. Their misguided designers are intent upon securing longitudinal and lateral stability and are ignoring entirely the spiral instability of such a plane. Unquestionably this is due to a lack of understanding of what spiral instability is, what causes it and the disastrous results such a combination of design factors produce.

A model of this type will fly very well during many flights, but if it gets into a fast turn with the nose dropped slightly, it will go into a tight spiral and crash. This characteristic is not as marked, however, as in the cases of types (G) and (J), in the diagram, which will be considered later.

This type (E) can be recommended only for slow flying rubber jobs where stability is not a prime factor; possibly in the case of flying scale models where scale requirements demand that the line of thrust should be low.

The model type shown in Fig. (F) is similar to type (C). However, in type (F) the wing has been lowered to the top of the fuselage and propeller and motor have been lowered to the center line of the fuselage. When the wing has a normal amount of dihedral the C. of L. A. then will be located about on a line with the C. of G. If the thrust line should be located nearer to the top of the fuselage, the C. of G. would be above the C. of L. A. when the wing embodied a normal dihedral. Of course the wheels could be made

heavier which would lower the C. of G. to the desired position. This would be advantageous as the thrust line would be above the C. of G.

With a normal dihedral the longitudinal and lateral stability is fair and sufficient for a contest model. The spiral stability is excellent as the C. of L. A. is low. By using a large dihedral on the wing, the distance from the C. of L. to the C. of G. would be increased and much greater longitudinal and lateral stability would result. The spiral stability would be less as the C. of L. A. would be raised by using a large dihedral.

Models of this type (with long nose and low landing gear) are very suitable for contest work.

Now we come to type (G) which the reader will recognize as typical of many gas engine models.

The thrust line being low and the wing parasoled above the body, a very low C. of G. is insured. This condition provides exceptional lateral and longitudinal stability. However, the C. of L. A. is very high in this type. Thus such a plane would be very unstable spirally. For this reason this type should never be used for gas jobs if crashes are not desired. The speed of a gas job always increases the effect of spiral instability. It is suitable for slow rubber power jobs or flying scale models.

Type (H) is exactly like type (G) except that the wing is not parasoled but rests on the top of the fuselage. Because of this, the distance from the C. of L. to the C. of G. is less than in type (G); thus, such a plane would have less longitudinal and



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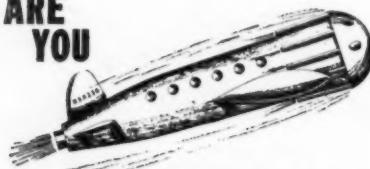
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1/8x1/4 .08	10 ft. .10	1/8x1/4x12 .08
1/8x1/4 .08	4 ft. .10	1/8x1/2x5 .08
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lateral stability than type (G).

The C. of L. A. would be lower than in (G) but it still would be well above the C. of G. which fact would cause spiral instability.

This type should never be used for gas models because there is always the probability of a crash unless perfect balance and weather conditions exist. It is suitable for slow rubber powered jobs and flying scale models.

Type (I) has a combination of characteristics common to (F) and (H). It is similar to (F) in all respects except that the line of thrust (propeller and motor) has been lowered to a position near the bottom of the fuselage. It is similar to (H) except that the nose and the landing gear are longer. In effect it is the rubber powered contest version of (H). The longitudinal and lateral stability is fairly good due to the low C. of G. induced by the low line of thrust. However a certain amount of longitudinal stability is lost because of the long nose of the model.

The center of lateral area is above the C. of G. but it is lower than type (H). This is due to the lateral area of the wheels being far below the body which fact lowers the C. of L. A. from its position in (H). Thus the spiral stability of (I) is superior to (H). All three types of stability are fair in model type I. Such a type is suitable (but not best) for contest duration or distance models.

Now we come to the final type, (J), which typifies a low wing monoplane. In this case the center of gravity and center of lift are practically coincident. The C. of L. is usually slightly above the C. of G. Thus there is no pendulum effect to enhance longitudinal and lateral stability. These qualities can be induced to a sufficient extent, however, by the use of large wing dihedral and longitudinal dihedral. The longitudinal and lateral stability of such a plane may be called only fair.

However, because of the low wing the C. of L. A. is low and about on a line with the C. of G. This makes a plane of this type exceptionally stable spirally. Thus it is suitable for speed contest models or fast models of any class. Though the recovery forces may be small, the forces which resist a displacement in flight are large. Such characteristics qualify this type as a steady flying speed plane. The duration qualities are not as pronounced as in other types.

In our next installment the necessary characteristics of speed models will be discussed.

Air Ways Design Contest

(Continued from page 15)

would have been satisfactory. In the case of every design of the parasol type submitted this mistake was made, the stabilizer was set at zero.

The landing gear of this ship is heavy, as hard wood wheels are used. It is also set well forward which insures that the center of gravity will be located close to the nose of the plane.

Now let us look at the lateral stability. The dihedral on the wing is unusually large, the wing is also parasol. These two characteristics make for exceptional lateral stability. Directional stability is insured by

a fin which is of sufficient area to balance the disturbing effects of the large dihedral, the propeller torque and the fact that the lateral area of the wheels is located well forward of the center of gravity.

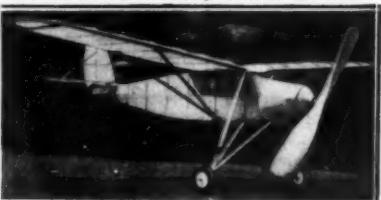
The duration of the ship is insured by its lightness of construction. You will note that the wing and tail are of built-up construction. Even the motor stick is hollow and of built-up construction. Because of this the wheels may be of lighter weight in order to balance the ship, if the rest of the model was heavy. The lightness of the model also will allow it to fly on few strands of rubber.

The pitch of the propeller is slightly less than one and a half times the diameter, which should give excellent travel and consequently good climbing qualities. The propeller is large enough to give duration but small enough to cause little resistance when gliding.

A number of other models had these characteristics. However, they were at fault in other respects, according to the rules of the contest. Either the model was not laid out well on the page or the drawings and printing were not neat. In one case the design of the ship was perfect except for the fact that the designer specified stabilizer and rudder with a thickness of $\frac{1}{8}$ " and on the drawing he showed his wing well forward. This was inconsistent for with such a tail group it would have been impossible to put the wing in a position shown, unless the wheels were so heavy that the model would barely fly. In

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other words, one of the characteristics of a stability job should be exceedingly light tail surfaces. Possibly some will recognize also that heavy tail surfaces increase spinning moments.

Another fault and one which was probably due to not reading the rules carefully, or understanding the purpose for which the model was to be designed, was the lack of a landing gear. There were several who submitted stick models without a landing gear. A stick model without a landing gear is notably unstable. In fact, various tricks must be used in order to endow a model with any degree of stability so they will fly.

In one of these models the tail was set at a negative angle and the wing was set well forward. This is an impossible situation, unless the nose was weighted extremely. The center of gravity of this model, as shown in the plan, would have been well back of where the wing was actually placed on the model. This would have produced a very long nose to the model and would have resulted in considerable longitudinal instability. Not only this, but because of the lack of a landing gear the center of gravity would have been considerably above the motor stick. This means that it would have been above the line of thrust and that the distance from the center of lift down to the center of gravity would have been very small. Consequently, the longitudinal and lateral stability would not be great.

Inconsistencies in many drawings caused the loss of an award. In one view some part would be shown in a certain position and of a certain shape, while in another view the same part would obviously have different characteristics.

It is hoped that Air Ways readers who

entered the contest have received much enjoyment and information from their participation.

Design Contest No. 2

Now we are going to give you a chance to try your art of design again. Contest No. 2 has started in this issue. The object of the contest is to design a stability fuselage model with an eye for duration. The stability of the model should be of high degree. The contest is to be judged according to the rules of the first contest, which appear in the first part of this article. The plans are to be presented in ink, drawn within a border of 7" x 5" or 14" x 10". If you make your drawing 14" x 10" you must bear in mind that if your drawing is printed it will be reduced to 7" x 5". Therefore, the scale which is marked on the drawing should be one-half of that to which the drawing is actually made.

The prizes to be awarded for the various planes will be the same as in the first contest.

Many helpful suggestions in respect to the design of a fuselage model will be found in the articles by Charles Hampson Grant in the September, October and November issues of MODEL AIRPLANE NEWS.

The contest is open to all Air Ways Club members in good standing. When submitting your entry be sure to put your membership number on the drawing. All entries must reach this office by November 21st. The decision of the judges will be final.

Here's a chance for Air Ways Club members to gain valuable experience in design and possibly an award which will help to promote their future model building. Get busy!

"Gas Lines"

(Continued from page 27)

We have some important news from Jack Thompson of 1985 South Penn, Denver, Colorado, concerning the first gasoline model airplane contest that was held in Denver in conjunction with the "Mile Hi-Hats" Air Races in July. The contest was sponsored by the "Mile Hi-Hats" Model Airplane Club and was directed under National Aeronautic Association rules. This is the first gas model airplane club to be organized in Denver and boasts a membership of thirty-five. The club was organized last January and since that time members in the club hold three world records.

There were twenty-eight entries in the contest, mostly from the club. However, there were several outside entries. Don Spaulding and George Crose won first place with a time of one hour, three minutes, nine seconds, which established a record for the Open Class. Second was Paul Buirgy with a time of thirty-five minutes, fourteen seconds. Robert Van Buskirk was third with thirty-one minutes.

Thompson has been kind enough to send us pictures No. 11, No. 12, No. 13 which show various scenes at the contest. Picture No. 11 shows Jim Baugh and Jack Thompson's model. Picture No. 12 shows Ellis Evans and Miles Spickler with their scale model Aeronca. It is a swell job. Picture No. 13 shows

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Considering the fact that the take-off of the winning model was from a point over 5000 feet high, Don Spaulding's world record flight was very unusual. The ship flew out of sight. Three days later it was learned that it had landed safely in a ball park in Golden while a baseball game was in progress. This, of course, upset the ball game. Without knowledge of how the plane happened to land there, one of the players took it home. Later reading of the record flight, the baseball player communicated with the owner.

The flight was officially timed by a National Aeronautic Association official and sent to Washington, D.C., to be certified. Comparing the take-off with the time of the landing in the ball park, the model apparently was in the air for approximately 4 $\frac{1}{4}$ hours. If models could talk this ship would certainly tell an interesting story about its wanderings.

Just as we go to press we get more news from Mr. Pattol. Though Pattol has been previously mentioned in the column we feel that this news is too important to hold. He has built what he believes to be the first successful flying wing. It is shown in picture No. 14. It was test flown at San Francisco Bay Air-drome in Alameda, California, on August 2nd. It travelled three miles in five minutes and was exceptionally stable. It turned in a good glide. We have never heard of any other successful flying wing, but possibly some of the readers may know of one. If not Pattol deserves a great deal of praise for pioneering in such an important field.

Unit News

Recently a gas model contest was held by the Metropolitan Model League of Newark, New Jersey, and New York City. In the League are units No. 4 and No. 7 of the I.G.M.A.A. At this contest a type of event was held which is new to the east, namely controlled flight. Believing that most model builders would rather not compete in a contest which necessitates the flying of their gas models in such a manner as to invite the chance of their flying out of sight and being lost, each contestant was given sufficient fuel for a forty-five second power flight. The forty-five second power run was controlled by the amount of fuel or with the aid of a timer or other mechanical device which would cut the engine after forty-five seconds.

We feel this to be a great step forward and one that should be popular with gas model fans. Final results of the contest have not been received as yet.

We hear from the South River High School Unit, No. 8. This is an exceedingly progressive unit. It seems that money was needed for a new engine, so on July 9th the unit sponsored a bingo party and enough was made to buy another motor. John Czajkowski, of 12 Arlington Avenue, South River, New Jersey, secretary of the unit, says:

"Several of our members including Douglass Hunt, James Doeler, Joseph Borichewski and myself recently 'chipped in' and purchased supplies to build a six foot cabin gas model which I designed.

It took us four days to finish it."

Their motor has not yet arrived so they are using the club motor mounted on a Grant mounting. The ship weighs approximately four pounds and flew on its first trial. The climb was exceptionally fast and the glide slow and flat. Although it has made only five flights, one of these flights was of four minutes duration.

Czajkowski writes further that they also plan to start a membership drive this fall and will have guest speakers at the meetings to stimulate interest among the students of the school.

Mr. Jesse Bieberman of 3219 East Brighton Street, Philadelphia, Pa., director of unit No. 6, writes and tells us:

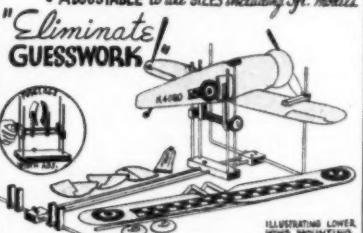
"On September 7th our unit held an organization meeting and later in the month we are holding our first I.G.M.A.A. meet. Our unit is known officially as the Philadelphia Gas Model Association. I believe we have one of the largest units. To date I have about twenty active members and many more prospects. (Though Jesse has a very large and active unit, there are many others including Mr. Allen's of Pittsburgh and Mr. Polk's of Newark and New York which are larger.) We are now busy seeing that the planes of the unit members are licensed."

We have the following report from Bill Efinger of 53 Berkeley Place, Brooklyn, New York. He is director of Unit No. 5 of the I.G.M.A.A. It is known as the Atlantic Gas Model Club. He says:

"Four members of the unit attended the National Contest at Detroit, and while no high places were taken, every member did at least eight minutes time. The unit was also represented at the

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Lebanon Contest on August 29th.

"Among the activities of the unit this past summer was the development of small gas models. Small models of less than four foot span were built by Petrides, Stadlemeier, and Heit.

"It has been found that a small engine is not necessary for small planes, the Brown motor being light enough to power planes with as low a wing area as 200 sq. in. The weight of the power unit can be reduced by using a lightweight coil and pencil batteries. An entire ship can be built which weighs only 1½ lbs.

"The chief trouble with the small planes is vibration which tends to change wing setting and loosen battery connections. However, this is overcome somewhat by opening the engine wide. At full throttle the torque is reduced and the engine performs smoother.

"Among the planned activities for the winter months is the further development of the radio controlled model which is now nearly completed; tests on propeller designs and the development of synthetic high power fuels."

From Denton Stockton of 447 Arvin Street, Bakersfield, California, we have word that the Bakersfield Aero Engineers have just completed construction of a gasoline powered model airplane which he designed. Stockton wants to pass on to readers a little hint which he feels may be of value. He says:

"For those who fasten the wings to the fuselage of their models with rubber bands I would like to suggest the following:

"Cement a strip of $\frac{1}{8}$ " flat rubber to the wing supporting rails so that the rubber will be between the wing and the rail. Use rubber cement. You will be surprised at the rigidity of the wing-to-body connection, even when few binding bands are used to hold the wing to the body."

From John Knowland of 1006 West 12th Avenue, Vancouver, B.C., Canada, president of the Vancouver Gas Model Club, we have received the following:

"I wish to take exception to the words of Donald G. McLeod of 932 Ingersoll Street, Winnipeg, Canada, where he says that without a doubt Winnipeg leads in Canadian gas model activities in 'Gas Lines' of August MODEL AIRPLANE NEWS.

"Judging from his remarks Winnipeg has not nearly as many gas models as Vancouver. We have about ten finished models now and more due to be finished very shortly. So you can see that we have quite a lead over Winnipeg."

Perhaps this discussion between Winnipeg and Vancouver could be settled by the respective parties sending in accurate data regarding their membership and activities. May we suggest that these two clubs stage a contest to see who is the better club in respect to flying gas models, regardless of the number of members. We hope neither of them is afraid of the truth.

We have received the following report from Jim Cahill regarding the Indianapolis Gas Model Association:

The Indianapolis Gas Model Association held its first meeting recently. Offi-

cers are: Harold Stofer, chairman; Robert Atkinson, Vernon Boehle, Mrs. Thelma Stofer, secretary-treasurer.

At present this club is not affiliated with any national organization.

First contest held on Aug. 2nd. Conditions windy; Gas Limit, 2 milliliters for every pound. Results were:

Kenneth Ernest.....	32 m.	30 s.
Harold Stofer.....	8 m.	53 s.
Mrs. Thelma Stofer.....	5 m.	34 s.

Fifteen models entered the competition from Indianapolis, Southport, Beech Grove, and Anderson. Any Hoosiers interested should write to Stofer at 413 Sanders St., Indianapolis, Ind.

Among the interested spectators was Leon Duray, who has been experimenting on two cycle in the 500 mile races.

Notices

William Oleksok of 4408 Crane Avenue, Detroit, Michigan, wants to know if there are any clubs around Detroit devoted to gas model planes. If there are, will they please get in touch with him for he wishes to join one.

We know of a number of young men who are machining and building their own gas engines, also that many difficulties arise in the process. If the International Gas Model Airplane Association can be of any service to them in solving any of their problems we suggest that they write to us for information.

To those who have not sent in for their gas model licenses we suggest that they take action immediately, as in future I.G.M.A.A. meets all models entered will

POWER MODELS!



70" HEATH PARASOL LNB-4

(For Motors $\frac{1}{8}$ to $\frac{1}{6}$ H.P.)

Kit contains all materials needed to build HEATH PARASOL (wood, glue, dopes, bamboo paper, wires, metal, bolts, etc.) also pair $3\frac{1}{2}$ " M & M GAS MODEL WHEELS; set of detailed blueprints and instructions; ready carved propeller; and many others.

COMPLETE KIT - - - - - \$12.50

COMPLETE KIT PLUS GWIN AERO MOTOR - - - \$28.50

Plus Soc post.

BABY CYCLONE MOTOR - - - \$27.50

Plus Soc post.

GWIN AERO MOTOR - - - \$17.50

postpaid

BABY CYCLONE MOTOR - - - \$15.75

postpaid

BROWN JR. MOTOR - - - - - \$21.50

postpaid

Detailed blueprints and instructions for HEATH-\$2.25

postpaid.

14" 3 piece laminated props for BROWN JR.—\$2.10 P.P.
13" laminated props for GWIN AERO or BABY CYCLONE—\$1.35 P.P. $3\frac{1}{2}$ " M & M gas model airwheels—\$1.25 per pair P.P. IMP TORNADO 8-2 motors—\$5.25 P.P. "MR. MULLIGAN" kit including IMP motor—\$12.75 P.P. "MR. MULLIGAN" blueprints—\$1.25 P.P.

Send 3c stamp for catalogue.

RUBIN MODEL AIRCRAFT LABORATORY

23 No. Brighton Ave., Atlantic City, N.J.

PEERLESS 24" WING SPAN FLIERS

25¢



25¢

REARWIN SPEEDSTER (pictured)

1936 TAYLOR CUB

MONOCOUPE
KINNER SPORTWING

NOW! for the First Time, you are able to get a genuine Peerless model in a Big Wing Span Flier -- and at what an amazing price.

All materials are included in these dandy kits: Quik-Set Cement, Tissue Cement, printed balsa wood, saw-cut strips, plenty of rubber, colored tissue, turned wheels; and best of all, a Turned Balsa Cowl or special nose-block, sanded smooth, exact size, and ready to put on your model.

DEALERS: Especially attractive discounts make these new Peerless kits today's great value. Write now, on business letterhead for prices.

THE PEERLESS MODEL AIRPLANE COMPANY
10316 MADISON AVE. CLEVELAND, OHIO, U.S.A.

A New Star in the MEGOW SKYWAYS STINSON RELIANT

**3/4 INCH SCALE
FLYING MODEL**

**THE MOST COMPLETE KIT
OFFERED MODEL BUILDERS TODAY \$3.00**

Megow's new $\frac{3}{4}$ inch scale models leave nothing to be desired in completeness nor in perfection of detail. Every precaution has been taken to make construction simple and durable. Several months of experimental building and planning is behind the accuracy, the flying ability, and the completeness of these new "Plane-of-the-month" Kits. Read the description of what the new $\frac{3}{4}$ inch scale Kits contain and then compare the prices with other makes.

Made Just As Accurately and Completely In $\frac{1}{2}$ Inch Scale Flying Model

75c

These smaller scale flying model Kits are a revelation in completeness of material, in quality and in accuracy of detail. Everything is there, including liquids.

Postage: If there is no Megow dealer near you, add 20c for postage on the $\frac{3}{4}$ inch scale model and 10c postage for the $\frac{1}{2}$ inch model.

Complete detailed plans and photos of skeleton and finished models. Finished flying prop and blade for scale prop. Oversize quantities of cement, tissue cement and colors. Correct colors in paper. Shaped wheels. Aluminum drag ring. Heavy celluloid for cabin windows. Movables included on tail and wings. All insignia. Description and material to complete cockpit including blocks to make pilot's figure. Upholstered seats, hinged cabin door.



**And here are 4
more star
numbers
by Megow**



★AERONCA A new exact $\frac{3}{4}$ inch scale flying model—the most complete Kit on the market. Includes all liquids—\$2.00. Plus 20c postage.



★SCHOONER YACHT A model of an 80-ft. sea-going schooner. Type used for sea cruising. A complete Kit—\$1.00. Plus 15c postage.



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★TAYLOR CUB One of the most popular Kits made. Fifteen-inch wings. Fast, powerful flyer. Complete Kit—\$1.00. Plus 15c postage.

CATALOGUE: Megow's Big 20-page catalogue will be sent you on receipt of 5 cents in stamps. Use the coupon.

DEALERS: The model enthusiasts in your community are asking for the new Megow Models. Be sure you are ready with a complete line.

MEGOW'S Model Airplane Shop

Howard and Oxford Sts., Philadelphia
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Howard and Oxford Sts., Philadelphia**

Inclosed is 5c in stamps. Send me your new 20-page catalog of Megow models.

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HURRY! DON'T WAIT TILL THE "REPS" YOU WANT ARE SOLD OUT-

Gradually the supply of these popular 20-in. "REPs" (Representative-Duration) flying models is being exhausted. Two models—the Cleveland Pirate Bomber, and Consolidated A-11 Attack—are sold out! For low priced, high flying models, these "REPs" have been the astonishment of the model airplane world. In value, they're typical C-D super value—years ahead of ordinary models. Be sure to order the ones you want immediately—go to your dealer today. If your dealer can't supply you, don't delay a minute but order direct. See instructions below. But above all, to avoid possible disappointment—HURRY—

The Ship that Set the Pace in Model Plane Design—at a Price that Sets An All-time Record in Bargains!



GREAT LAKES SPORT TRAINER 2T1-E—This famous design was formerly the flag ship of the C-D fleet—the ship that changed almost every known standard in the model aircraft industry. The kit originally sold for \$5.50, and being such an excellent flyer, with so many requests that we bring back this beautiful number, we have done so; and to show the extra quality in the present day C-D designs, this number is now being sold for 50c and is legitimately priced. The model is almost identical with the older design, with but few minor exceptions, and the changes are really improvements, so that you can see that we are selling better models in this lower price. Light, flying "R-X"-permitted Range at 50c today than we did a few years ago at \$5.50. 1/16th the price! 1/29 of this kit didn't even include printed out wood, yet it was a superb bargain at the time (from '29 to '32). This will show our present $\frac{3}{4}$ scale model value (SF-1 Great Lakes Sport Trainer Model 2T1-F) even at \$2.65 is several times better in general design and a far better bargain than what we sold originally at \$5.50. This fine flying model Kit—another experimental "REP" Kit (yes it's $\frac{3}{4}$ " scale too—if you want more!) suggested coloring orange and black. Kit No. R-X5063, complete (except liquids) only

50c

An Amazing MR. MULLIGAN

Everywhere this model appears, it attracts loads of attention. It's a flyer that puts on a beautiful show.

Add 15c per order of "Reps" for extra safe shipping containers

In appearance, the job looks like a million, due to its authentic detailing. Be sure to get this—and hurry to avoid disappointment. Kit R-52 complete except liquids) postfree, only 50c

50c

Nearest Approach Yet to a Rocket Ship! The 14 cyl. HUGHES RACER

Speed and flashing performance are designed right in this clever realistic model of the Hughes Racer. It's a peach of a miniature of the 350 m.p.h. super speed flyer—and one that every speed enthusiast will certainly want to build. Retractable landing gear—marvelous streamlining. Don't delay getting it. Kit R-54, complete (except liquids) postfree, only 75c

MODELBUILDERS—

Go to your dealer right away for these models—as we can't continue to guarantee the supply much longer. If he hasn't the ones you want, order direct (mentioning his name and address). Enclose check or money order—cash at your own risk. No C.O.D.'s. Canada, Mexico, British Isles customers—add 10%; all other countries, 20%. Send 10c for complete catalog of model airplanes and all hobby craft kits materials and supplies.

DEALERS: Big Christmas sales ahead—but you must act now. You'll do more business on C-D's in the next 3 months than on ordinary models in a year. Write immediately for full details.

ORDER AT ONCE



They're All Raving About This

RYAN SPORTSTER ST

This beautiful little two place job is well known to model-builders everywhere and our model looks as pretty as does the prototype. Span of course 20", suggested coloring, all silver, like the prototype. Model stable and fast. Kit R-58 complete (except liquids), postfree,

50c

13 outstanding features make these 20" "REP" Kits hard-to-duplicate values

- 1—Full size, detailed mechanical drawing—bulkheads, etc., drawn out for repairs.
 - 2—All wood printed out.
 - 3—Finished scale wood wheels.
 - 4—Fine turned cowl front or drilled nose supplied.
 - 5—Fine bearing button.
 - 6—Finished balsa prop.
 - 7—Real model airplane rubber.
 - 8—Real celluloid for windshields.
 - 9—All strip wood of the finest quality, accurately cut to size.
 - 10—White Japanese covering tissue.
 - 11—Insignia and wing lettering supplied, printed out.
 - 12—Wire, washers, etc., etc.
 - 13—Absolutely everything needed (even scale prop material, always omitted by others) except the liquids.
- Complete—Except No Liquids!

HAWKER—LOW WING MERLIN-POWERED FIGHTER

Landing gear may be fully retracted as on the prototype, coloring suggested all silver; insignia supplied. A "peach" for flights. Kit R-59 complete (except liquids) post free only 50c



Prize Winners? Sure!!

"As an ardent supporter of your models, I thought I would write and tell you of the results of a recent city-wide contest in Green Bay. In the junior low priced class ranging from 50 to 75 cent models, five C-D 'Reps' were closely bunched with Mr. Mulligan taking first and fifth, a pair of Fokker D-VII's (one of them modeled by my friend, getting the top prize) taking second and fourth, and a P-6E grabbing the third rating—that's a real C-D 'Rep' record."

Green Bay, Wis.



An Amphibian Never Yet Equalled—and probably won't be at this price

CLEVELAND AMPHIBIAN

Will float off water like the real thing. Span 28". Twin motored. Long stay flights. Kit R-X5001, complete (except liquids) only 60c



GRUMMAN F2F-1 FIGHTER

Latest Navy fighting ship, still on seas list. Big wing area makes model splendid flyer. Drawings cover both retracted extended landing gear. Kit R-63, complete (except liquids), postfree, only 50c



FOKKER D-7 FIGHTER

This actual 20" model photo is almost a twin look to the photo of our $\frac{3}{4}$ " model. Be sure to get it. Kit R-15, excellent flight, complete (except liquids), postfree, only 50c



Don't Fall to Build This Keen CURTISS HAWK P6-E FIGHTER Hard to tell this actual 20" model photo from our $\frac{3}{4}$ " model. Full of typical C-D authentic features and details. Speed flights. Kit R-21, complete (except liquids), postfree, only 50c

Clubs: Increase the prestige of your club and your members' aeronautical ability—by building C-D models. More and more Clubs are concentrating on C-D's. Write once for Club rates and discounts—Schools, to

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